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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Twenty-first Annual Meeting, Western Gas Association.

OFFICE OF THE SECRETARY,
NEW ALBANY, IND., April 6, 1898.

To the Members of the Western Gas Association: The twenty-first annual meeting of the Western Gas Association will be held at Detroit, Mich., May 18, 19 and 20, 1898, and will be called to order by the President, Mr. James T. Lynn, at 9:30 A.M., Wednesday, May 18.

The Russell House has been selected as headquarters, and the sessions will be held in a suitable room contained therein. The Executive Committee has arranged for the presentation of the following papers:

"The Enrichment of Coal Gas," by Mr. George H. Harper, Altoona, Pa.

"The Use of Gas for Purposes other than Lighting," by Mr. C. W. Blodget, Brooklyn, N. Y.

"The Igniting of Gas by Static Electricity," by Mr. Bankson Taylor, St. Paul, Minn.

"Recent Developments in Texas of Interest to the Gas Man," by Mr. Thos. D. Miller, Dallas, Tex.

"Observations of Methods Employed in Estimating Value of Gas Liquor," by Mr. O. O. Thwing, St. Louis, Mo.

"The Prepayment Meter," by Mr. C. H. Raynor, Adrian, Mich.

"Wrinkle Department," edited by Mr. E. H. Jenkins, Buffalo, N. Y.

"Some English Correspondence upon Isolated Generators for Bench Firing," to be read by Mr. G. Treadway Thompson, New York City.

The Michigan Passenger Association, the Trunk Line, the Central Passenger Association, the Southern Passenger Association and the Western Passenger Association, from points in Eastern Committee and Trans Missouri Committee territories, have granted rates of 1⅓ fare for the round trip, conditional on the presentation to the Secretary of 100 certificates for indorsement. The territory covered by the above Associations includes all States east of the Missouri and Mississippi rivers, except the New England States. It is further to be noted that the reduced rate applies to the following States and Territories west of the Mississippi and Missouri rivers: Kansas, Nebraska, Colorado, Utah, Wyoming, Oklahoma, Indian Territory and Missouri.

All persons attending the meeting should purchase a first-class ticket at starting point, paying full fare for same and obtaining from the agent a certificate stating that the person whose signature appears on same has purchased, at full tariff fare, one first-class ticket to Detroit, which certificate, after it has been signed by the Secretary of the Association and a representative of the above Passenger Associations, will entitle the purchaser thereof to a one-third rate, returning home.

All persons obtaining reduced rates must apply to agent at least 30 minutes before departure of train. All station agents do not have a supply of certificates, but the certificates may be obtained on request, provided the notification is made in time. Persons outside the territory covered by the Passenger Associations named above should purchase a ticket to nearest point within said Associations' districts, and from there purchase a ticket to Detroit, obtaining a certificate entitling them to a one-third fare returning to the place from which the certificate was obtained. The Western Passenger Association for the first time has granted reduced rates, on the certificate plan, from territory east of the Missouri river and west of Chicago, Peoria and St. Louis. It is to be hoped that this will induce members in the territory named to attend the meeting, and that it will influence other gas men not members to join our Association.

Do not travel to Detroit on mileage tickets; it is just as cheap to obtain a certificate. Nearly one-fourth of those who attended our meetings the last few years used mileage books, which practice interferes in extending the territory in which reduced rates are obtainable.

All queries sent to the Secretary for the Question Box will be assigned to members for answers.

A cordial invitation is extended to members of other Associations to meet with us and to participate in the discussion of papers presented.

The Secretary will be pleased to answer any communication pertaining to the meeting, and will mail applications to those who desire to become members of the Association. JAMES W. DUNBAR, Sec.

[OFFICIAL NOTICE.]

Wrinkle Department, Pacific Coast Gas Association.

MERCED, CAL., March 11, 1898.

To the Members of the Pacific Coast Gas Association: At the last meeting of the Pacific Coast Gas Association to me was delegated the duty of collecting and presenting any matter, in the shape of original ideas or special devices, which may come under the head of "Wrinkles," to be presented in proper form for the benefit of the Association at the next regular assembly.

Many of our members having charge of gas plants on the Coast have many plans, that are practical, handy and labor-saving, which many others by force of circumstances have never seen, but who, on presentation of the device, drawn and described, or through the medium of our official organ (the AMERICAN GAS LIGHT JOURNAL), would gladly embrace the opportunity, and put into practice a plan very beneficial—which perhaps had been in use in some obscure place many years, used exclusively by one man—that would, when given daylight, benefit the whole gas fraternity.

On reading this communication, please see if you have not forgotten something in the shape of a "Wrinkle," that is doing good service in your works, that would be of great importance to the Association. Your answer to this will greatly oblige.

GEORGE H. HOLLIDGE,
Editor "Wrinkle" Department.

[OFFICIAL NOTICE.]

April Meeting, Society of Gas Lighting.

OFFICE OF THE SECRETARY, April 1, 1898.

The April meeting of the Society of Gas Lighting will be held in "The Arena," No. 39 West 31st street, New York city, at 3 P.M., of the 14th inst. FRED. S. BENSON, Secretary.

BRIEFLY TOLD.

DEATH OF COLONEL A. W. STARK.—We regret to have to report the death of Colonel Alexander Wilson Stark, who died, at his home in Norfolk, Va., on the morning of the 6th inst. Deceased was for some years President of the City Gas Light Company, of Norfolk, Va., having succeeded in that position the late Mr. C. S. Allmand. In fact Colonel Stark's incumbency of the office of President only terminated on the passing into new hands of control in the Company, which event was of comparatively recent happening. Colonel Stark, who was born in 1842, was, on the breaking out of the war of the rebellion, a petty officer in the United States Navy; but as his sympathies inclined him to the Southerner's view of the conflict, he enlisted in the Confederate army, which he served with such zeal that the close of the warfare found him clothed with the title of Colonel—his service had been almost altogether with the artillery. Returning to Norfolk, he engaged in the merchant marine trade, and as Captain, directed the movements of many ocean going steamships. As before stated, on the death of Mr. Allmand, he succeeded to the Presidency of the Norfolk Company, in the administration of the affairs of which concern he had the full confidence of its proprietors.

NOTES.—The proprietors of the Logan Iron Works, of Brooklyn, N. Y., have been awarded a contract for the installation of a water gas plant, for the Brooklyn Borough Gas and Fuel Company, equal to a daily production of 1,000,000 cubic feet. The "Borough Company" is the concern which has absorbed the properties of the Company that formerly supplied Coney Island with gas.——The contract for the new works at Princeton, Ind., has been awarded to the Western Gas Construction Company, of Fort Wayne, Ind. The contract calls for a complete plant of the improved Lowe type, the Construction Company to furnish, besides the generators, a holder, purifiers, boiler, oil storage tank, iron roofs, meter, governor, etc.——Mr. George Treadway Thompson sailed for Europe last Saturday. He will remain abroad about a month. We regret to say that the trip is taken solely to benefit his health.——A new schedule of selling rates has been arranged by the United Gas Improvement Company in connection with its branch at Harrisburg, Pa.

[Concluded from page 510.]

PROCEEDINGS FOURTEENTH ANNUAL MEETING, OHIO GAS LIGHT ASSOCIATION.

HELD AT CLEVELAND, OHIO, MARCH 16 AND 17, 1898.

SECOND DAY, MARCH 17—MORNING SESSION.

The President called the Association to order, for the sessions of the second day, at 10:30 A.M., March 17th, and announced that the first number of the regular order would be the paper, by Mr. G. A. Hyde, Engineer Gas Light and Coke Company, Cleveland, Ohio, on the

EFFECT OF DEFLECTION IN ALIGNMENT ON THE FLOW OF GAS IN STREET MAINS.

[For MR. HYDE'S paper, see JOURNAL, March 28, p. 497.]

The President—I will call upon Mr. McDonald to start the discussion on this very interesting subject.

Mr. McDonald—Was the pipe which was laid at a right angle bend equipped with a mitered joint, or was it bent in a sharp curve?

Mr. Hyde—It was a mitered joint.

Mr. McDonald—Then as there was a loss of area I believe the diminution in the flow of gas was due to that fact?

Mr. Hyde—There was no loss of area. It was a full-sized joint.

Mr. McDonald—In the ordinary cast iron fitting I think the gas has a better chance to get around it than in the case of a mitered joint. Perhaps a fairer test of the effect would be to bend a pipe to a right angle rather than to use a mitered joint. If the named result could be produced by bending the pipe to a sharp right angle, I think those engaged in laying mains should look out for it. In other words, I do not believe that the causing of gas to move at a right angle, through a very short bend in the pipe, without a reduction of area, would cause so much of a loss as Mr. Hyde's experiment seems to indicate.

Mr. Hyde—Let me suggest that, in making a right angle joint, or a T leading off from a gas main, it is always a mitered connection, absolutely of the full size of the pipe going forward and the full size of the branch. It is a mitered connection, absolutely true. A piece was sawed out of the running pipe and the other so fastened and fitted to it that it was an absolute representation of a cast iron pipe, such as everybody uses in the gas business. The custom in water works is to enlarge and make curved startings-away.

Mr. McDonald—Those are rounded a little on the side.

Mr. Hyde—I do not know anything about that. I did not try that; it was not the illustration which I used. I was endeavoring to show that the universal practice of gas men, in making right angle bends, was a practice which subjected the gas to a decreased flow, and it occurred to me that the main pipe should not be so laid, and the effect of that kind of construction was illustrated in the experiments indicated. In a pipe with two one-eighth deflections (just such pipe as you would use in the street mains) it was 1 per cent., but where it was directly square, or a right angle deflection, it was 4 per cent. Now, if this T were going to occur and recur, as they would many times in a right angle town, everyone of these recurrences would mean a loss of 4 per cent., according to my test. I made these experiments simply in order to call your attention to the facts which were to be obtained from them. As to the exact effect of continued obstructions, from recurrences of T's in a right angle town, I did not go into or elaborate upon. I simply brought this subject to your attention, believing it would give us all something to think about. My belief is it is better to put in bends rather than right angle deflections.

Mr. McDonald—I have no doubt that two one-eighth deflections will give less obstruction than one-quarter bend, and I have no doubt the obstruction is appreciable; but I do not believe that the obstruction of merely changing the direction with an elbow, and not with a mitered joint, which practically dams the pipe up at that point, would cause a loss of four per cent. I believe, however, it would cause an appreciable loss, but not that much, and that is why I asked the question.

Mr. Hyde—Not one time in a hundred do you put in an elbow when you are running along straight, and turn off at right angles. The method or practice of most persons in laying mains is to turn off at right angles, but my suggestion is entirely different from that. While it may not have been done, yet the results of the experiments made show what may be obviated by making these other deflections. My experiment shows conclusively, so far as I am able to determine, that a difference of 3 per cent. arises as between two one eighth deflections or one right angle deflection.

Mr. Jenkins—This 4 per cent. is practically upon the full capacity of the pipe?

Mr. Hyde—Yes. I put in 16 feet of ½-inch pipe, so as to have no hindrance.

Mr. Jenkins—So, if the discharge pipe was a great deal larger than the maximum capacity of that pipe you would not have 4 per cent.? A great many of our mains are made purposely larger than the full quantity of gas we require, owing to which the proportion or percentage would be reduced.

Mr. Hyde—To that extent, certainly. Here is another thing. Starting from the works you come to a branch street almost immediately; there is the place where you ought to use it. If you are off a mile or two from the works it might not be so necessary to use this form of deflection; but the pipes closer to the works, through which pipes a greater proportion of the total volume of gas passes, should have the least amount of obstruction, and it is at those places where you ought to put in these bends instead of the right angle bend. The object and purpose should be to get your gas into the outlying districts with as near the pressure given to it at the works as possible, so as to have a uniform distribution of pressure; and in that direction I think much may be accomplished by those bends.

Mr. G. W. Barnes (Pittsburgh, Pa.)—In making this connection, why did not Mr. Hyde use a Y?

Mr. Hyde—A Y could have been employed, but I simply suggested my plan as one way.

Mr. Barnes—The diagram shown in the paper illustrates a right angle deflection; and in addition to that, an eighth in two small branches?

Mr. Hyde—Yes.

Mr. Barnes—It gives you, in addition to the right angle deflection, an eighth?

Mr. Hyde—In which figure do you mean?

Mr. Barnes—Figure No. 2.

Mr. Hyde—I simply outlined that as a method that might be pursued in making the deflections suggested.

Mr. Barnes—Taking the cut literally, you would have an eighth, in addition to a right angle deflection?

Mr. Hyde—You might use a Y, but you would have to make a pattern for it, and would have to be at the expense of getting extra castings, whereas for the bend I have suggested you have the pattern already made. It might be a matter of economy to do it this way, but the Y would answer the same purpose.

Mr. Barnes—I have used in such cases the idea that you suggest, but we have always found that we can get the Y in the start.

Mr. Hyde—For a large main?

Mr. Barnes—We have never had any trouble, up to 10-inch.

Mr. Hyde—I never saw one. Connections of that character may be made by some of our foundrymen; but if they are making them I do not know it. What I was endeavoring to plan was a way to obviate as far as possible the loss by reason of right angle deflections.

Mr. Barnes—I used the deflections spoken of by Mr. Hyde, save that I employed a Y for the purpose, as much as 10 years ago.

Mr. Hyde—I am glad you did. You were ahead of me, that is all.

Mr. Thompson—Mr. Barnes anticipated one of the points I was going to make in criticizing Fig. 2 in Mr. Hyde's paper, in that, on the straight-away line—true, the smaller, but nevertheless an important one—in place of a straight line, a ⅛th and a 90° bend are introduced. The Y construction is entirely practicable.

Mr. Hyde—Oh, yes; certainly.

Mr. Thompson—I think the distribution system in the City of Cleveland is recognized as being a thorough, in fact, I might say, an ideal plan—the use of a circle of pipe, surrounding, so-to-speak, the entire city, which I understand is the system employed here.

Mr. Hyde—In a measure, that is so.

Mr. Thompson—So that the pressure is maintained almost uniform throughout the entire district. A year or more ago Progressive Age published a series of charts, prepared by Mr. F. Southwell Cripps, of England, showing the rate of flow in various sizes and length of main, and giving some formulas—empirical ones it is true, but nevertheless practical—and indicating the friction and loss of flow due to various forms of specials, T's, elbows, etc. It might be well for us to refer to these diagrams and to the explanations which accompany them in our reference to this paper later on.

Mr. Mayers—In Mr. Hyde's paper I notice the principle is set forth (a plan which I have always followed where the initial cost of the pipe cuts no figure) of using bends in making a right-angle turn. I do not know that there are any figures showing the exact percentage of loss due to friction caused by a right angle bend, but I have endeavored to avoid that friction by the use of bends of this kind. I really think that the Y in this case would have done just as well or better than the T.

Mr. Wilkiemeyer, being called on by the Chair, said—As my attention was called to another matter I did not pay very close heed to the remarks of the last speaker. However I will say that my practice is to make provision for the future by putting in larger pipes than present needs call for. We had quite serious trouble some years ago in getting thorough distribution, but we now are having no trouble, the result of "making the ends meet" and putting in larger pipes.

Mr. Moses—It has been determined that if in making an elbow you make the radius five times the diameter of the pipe there is no loss by friction.

Mr. Christian—I would like to ask Mr. Hyde if he has ever used any elbows and T's made for water service or water pipe, in the laying of gas mains?

Mr. Moses—They are made on a curve, and upon the plan I just suggested, the radius being five times the diameter.

Mr. Hyde—On some of the smaller pipes we are using T's of the water works style, but only on the small pipes. We have not laid any large pipe lately. The last large pipes (30 inches diameter) laid by us were laid in the regular method; but since then I have been giving this matter some thought, and, gentlemen, I may say I have accomplished just what I aimed to accomplish. I did not know whether I was presenting anything new or anything that you had not all thought about and worked out in your own minds. I had not heard anybody speak of laying pipes by this method, or accomplishing a saving in friction by this mode of deflection, and I prepared this paper for the purpose of calling your particular attention to it and bringing the matter up for discussion. I am very glad to know that others have thought of the same thing and have been working along the same lines. If we do not speak about such matters we will never know whether anybody else has thought of them or not, and by an exchange of views and thoughts upon such a subject I think much benefit can be derived. It was with that object in view that the paper was prepared.

The President—Noting conference going on between Mr. Witherby and Mr. Thompson I will call upon Mr. Witherby to give us the benefit of the suggestions which are being made with reference to this subject.

Mr. Witherby—My experience in the laying of street mains has been confined almost entirely to pipes less than 10 inches in diameter. On the smaller sizes I do not believe it makes such a vast difference. When one is laying 24 or 30-inch pipe it may amount to considerable; but in the smaller sizes, where the capacity is fully as large as is necessary, I do not think a man should hesitate much to use what he has on the ground.

Mr. Mayers—I think in the case of a 10-inch main, where the pressure is raised high on account of pumping, and where the central station is located some distance from the holder, it is a very important matter to reduce these right angle bends to easy bends or water bends, and I think it would apply to a 10-inch pipe as well as to a 24-inch, a 30-inch or any other larger size. In fact, I think it would apply even more so.

On motion of Mr. Thompson, a vote of thanks was tendered to Mr. Hyde for his valuable paper.

The President—Before going into executive session I will ask the Committee on President's Address to make its report.

In the absence of Mr. George H. Tayler (Chairman of the Committee), Mr. Fred. R. Persons submitted the following

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Mr. President and Gentlemen: The Committee to whom was referred the very able address of our President, begs leave to submit the following report:

The address, as we consider it, reflects great credit upon the writer. Its departure from the usual form of addresses, which have almost universally considered the manufacturing and distributive part of the business to the management of gas companies, is an innovation welcomed.

The point which the President makes in regard to giving information of "something of interest to us in the gas business," is well taken, and we urge every member of this Association to take it home to himself.

The President shows himself to be up-to-date in urging every possible economy in all branches of the business.

In regard to the consolidation of smaller companies, we find as many opinions as there are members of the Committee, and, therefore, leave the question with the Association.

The question of municipal control as treated by the President meets with the hearty accord of every member. We would respectfully urge a paper on the subject for our next meeting.

We would also suggest that the Association take action, and have a

committee appointed to look into the matter of municipal control, as well as a committee on statistics.

A time should be set apart at this meeting to discuss the coal tar question, as it is of vital importance. It might be wise to revive the committee on coal tar for future action. However, this can be discussed in connection with question No. 11.

Respectfully submitted,

GEO. H. TAYLER,
GEO. H. CHRISTIAN,
FRED R. PERSONS,
} Committee.

The Secretary—Gentlemen, you have heard the report of the Committee on President's Address; what is your pleasure in regard to it?

Mr. Doherty—I move that it be accepted and that its recommendations be adopted. (Carried.)

The President—The report of the committee as I understand it recommends the appointment of three committees; on municipal control, on coal tar, and on statistics. I will announce the appointments at a later time. A few questions in the Question Box have not yet been discussed, and we will take them up before we go into executive session.

Question No. 5.—"What are the easiest and best means of increasing product a *little* in coal gas plants in winter months?"

The man who asked that question is certainly very modest, as he seems to want only "a little" increase. I will call on Mr. Tayler to open the discussion.

Mr. Tayler—I do not know that I have anything to say on that subject. The only way I make a little increase is by putting in more retorts and keeping them up. I do not take many chances in the way of running short of gas. I have no other way of making gas except from coal and by the use of retorts, and aside from using oil in the retorts I do not know of any other way of increasing the product except to provide an abundance of retorts and keeping the benches properly fired up.

The President—What is your experience at Youngstown, Mr. Coombs?

Mr. Coombs—I think our experience is about the same as at Warren. The method outlined by Mr. Tayler is quite like that pursued by us. We would increase our output, if found necessary to do so, by increasing the number of retorts. We use cannel coal only as an enricher. Probably other gentlemen, in a different position, as for instance with a water gas plant, would do differently.

Mr. Whysall—That plan will work out all right I think, if you have an extra generator and an extra set of benches; but suppose that even these are all working and you are still a trifle short of the amount desired? I have tried to increase the product a little by using wood, and find that I can bring up the candle power also by the use of some cannel coal. You can make gas rather rapidly from wood.

The President—Any particular kind of wood?

Mr. Whysall—Well, when you get to that point you are not very particular about the sort of wood you use.

The President—I meant, soft or hard wood.

Mr. Jenkins—For convenience I would suggest dry wood.

Mr. Hyde—Many years ago when in a "pinch" of that kind we used rosin, but we had to be very careful about the quantity used and how it was charged, but it makes gas fast. When you want to increase your product a little I find that you can tide over an emergency for an hour or two by using rosin, when you would have been floored if you had not availed yourself of some such expedient. However, as I said, you have to be very careful how you use it, because it burns very rapidly.

Mr. Templeton—We had some experience last winter on the matter under discussion. Being in a tight place we filled a box full of sawdust, saturated it with oil and threw it into the retort. Another way with us when in an emergency is to pull the exhauster off pretty hard and then use enough cannel coal to counterbalance.

Mr. Thompson—One other point I might suggest, which has not been brought out in the discussion so far, is, if you have a coal shed, with anything like an inadequate capacity to carry you through the winter months, save your dry, lump coal, for just such an emergency as this; in other words, pick your coal when you get short. The use of a separate retort for carbonizing oil or naphtha is not practicable in small works. I am the engineer of a small company, making about 20 millions a year of coal gas, in which we use during emergency times, cartridges made out of 3-inch wrought iron pipe, the ends of which are drawn down and hammered together so as to make a tight joint, with ¼-inch hole in one end. Into that pipe oil is poured and a wooden plug inserted in the hole. The cartridge is then charged into the retort with the coal, the wooden plug burns out toward the latter part of the coal charge, and the oil, gradually finding its way into the retort, vaporizes and passes off with the gas. When we do that we run our exhauster a little faster and pull in a few feet of furnace gas.

Mr. Witherby—We have not the advantage of having a water gas plant, but when we get to the point where we are sitting on the curb, watching the holder go down, down, gradually, and watching the clock to see if the holder is going to strike bottom before half-past ten, what is the matter with a little bit of oil and wind? Getting to that point at one time, we drilled a ¼-inch hole through the retort lid, and about the last hour of the charge I took a piece of three-eighth pipe and ran it within about a foot of the back of the retort and then, with a small force pump, pumped in about 5 gallons of oil, just as slow as a man could pump. It was an emergency we had to meet and it was something that at that time filled the bill. I got to that point on account of having a crippled bench, where a flue caved in, and it was a serious question whether the town went dark or not. I figured in various ways to devise some plan that would furnish relief, and that was the only way that seemed advisable. I tapped a hole in the foul main, between the exhauster and the hydraulic main, and put in a cock. Then by speeding the exhauster I could pull my own wind and we would run from 5 to 20 gallons of oil inside in a 12-hour shift. We used at that time the Lima crude, which I was in a position to get, and it kept the town going. I am not saying anything about the quality of gas we furnished at the time, but it worked all right.

Mr. Butterworth—Another expedient in an emergency of this kind would be to run three hour charges instead of four.

Mr. Hyde—Another thing you can do is this: Suppose you are in a tight place with night coming on, and you have no extra retorts, no rosin and no oil, and you do not want to have the lights go out. Suppose the day was dark and the gas went out in spite of everything you could do, in order to get through the night so that the lights would not go entirely out, I have commenced immediately to shut down the pressure. If you were running 2 inches pressure, put it down to 15-10ths, and keep it down until the danger is past, so that you will be sending out about three-fourths as much as you would like to send out. Everybody in town would be glad to have three-fourths of a light rather than none at all. I have tided through such an emergency in that way when we would have been floored by 10 o'clock at night had we run our ordinary pressure. I have gotten through the night in that way, and nobody knew his lights had been in danger of going out. They thought perhaps the light was not quite as good, but I saved enough gas in that way to tide the night over by giving three-quarters pressure. At such times I have been down at the works and remained there all evening, calculating how much gas went out this hour and how much was to go out the next hour and cutting down the pressure, and have kept cutting it down until, when we got to half-past eleven, we had only a half-inch of gas in the gasholder. I would not let it go out, but kept cutting it down, and got through in that way without anyone in town knowing the straits we were in.

The President—There is a great responsibility resting upon us if the gas does go out, so I think all of these expedients are justifiable, even the "wind and oil."

Question No. 8.—"What is the best kind of a boiler for an average sized combined coal and water gas works?"

I will call on Mr. Guldlin to answer that query.

Mr. Guldlin—Judging from the standpoint of the manufacturer and from observation of different gas works, in my opinion, everything considered, the horizontal multitubular boiler is best adapted for such requirement, both as to first cost and as to maintenance and attendance. Where higher economy is necessary, as in the case of larger works, tubular or water tube boilers are more efficient and desirable; but for smaller plants, this is offset by the higher first cost and the more careful attention required. The multitubular boiler has always maintained itself as filling all of its requirements very satisfactorily.

Mr. Moses—My experience is that the Hazleton "Porcupine" boiler is about the best. We built a works in the Northwest some years ago where two kinds of boilers were placed. With the Hazleton boiler we got about 20 per cent. more gas in a given time than we did with the tubular boilers. They had only up runs, as they called them in those days, and no down runs; but we had hot steam all the time, and they clinkered the fires about every 12 hours.

Mr. Witherby—Mr. Moses, what repairs were required on that boiler?

Mr. Moses—On that boiler I could not specify, but I put in two boilers in Chicago, in 1890, that are still running, and I think $4 is the amount spent for repairs. The two lower cocks burnt up (when the

works burned down, during the World's Fair—the place was 12 miles miles from the city) at half past 2 o'clock in the morning, and we were making gas at noon the following day.

Mr. Witherby—Unless the blind end tube is made exceptionally good, isn't it liable to give trouble and burn and choke on the ends?

Mr. Moses—I have never had any such experience. If your boilers are cleaned out every two weeks and if they are examined occasionally you will never have that trouble. The boilers that I speak of were two 125-horse power boilers running day and night, and I haven't heard of a tube burning out.

Mr. Witherby—In Santiago, Cal., we put in two Hazleton boilers, the end tubes of which kept filling up with a scale formation, running back into the tube in spite of everything we could do. The men would go over the tubes and clean them just as well as they could be cleaned, but it would only be for a short time until the scale formation would again be found, with the result that they would finally burn across the ends and break open. These boilers were thrown out and the ordinary return tubular boilers put in.

Mr. Moses—I think what you refer to is a Hazleton tripod boiler. What I referred to was the Hazleton "Porcupine" boiler, which is built in New York. The former, which is made in Chicago, has a square end, but the one built in New York has a round end. In the boiler with the square end the scale forms in the corners and burns them out, but the tubes of the boiler made in New York are round and the scale does not form in them.

The President—If there is nothing further to be said on this subject we will take up

Question No. 10.—"A newly organized company starts to deliver, say, compressed acetylene gas, in cylinders, by a wagon service, conducting a gas business without opening the streets or asking any special privileges. Would such a company have to ask for any franchise other than a merchant's license, or be amenable to any authorities, so long as they observe the general city statutes as to health, police, etc.? Could an existing gas company, having a so-called exclusive charter, stop the new gas service conducted as above?"

We would like to hear what Mr. Templeton has to say upon the subject, and afterwards we would like to hear from Mr. Greenough on the matter.

Mr. Templeton—Unlike the plan followed in Ohio, we have in Pennsylvania what we call exclusive charters. All that means is that a second company cannot get a franchise from the State which will authorize them to occupy certain territory. Of course, there is a question in Pennsylvania as to whether or not the consent of the Council is required. I am inclined to think it is not necessary in this State for such a company to ask for any franchise. I do not see how you can prevent any person from selling acetylene gas. I do not see how you can prevent them delivering it just as they would deliver potatoes, or bread, or merchandise of any kind. I do not think it would require anything more than the ordinary mercantile license. Of course, this question is modified by the statement that they must comply with the rules provided by the ordinances of the city as to health, police, etc. The department of safety of a city or town might prohibit or restrict its sale, just as they would prohibit the sale of gunpowder. I believe compressed acetylene has been held to be very dangerous. If I recollect right, there have been some bad explosions on account of compressed acetylene gas, and I have no doubt, by reason of its dangerous character, that its sale could be prohibited; but I do not believe it could be interfered with on the ground of any exclusive charter at all, any more than you could prevent a man from selling oil. I do not see any difference in principle. I do not think you could any more prevent a company from selling and delivering acetylene gas than you could prevent the Standard Oil Company from selling and delivering oil.

Mr. Greenough—I agree, Mr. President, with the gentleman who has just spoken. I do not see how you can undertake to interfere with the distribution of acetylene gas, owing to any statute affecting the distribution of gas to the consumer. The position I should take in that case, if it were brought into this city, would be to bring it to the attention of the insurance companies on account of the danger connected with its indiscriminate use, and call their attention to the regulations which have been adopted in other cities where they have had serious accidents by reason of it. And I do not believe, under such circumstances, it would be permitted very long. But as for undertaking to make any such company get a charter from the city, or any permission from the city to do it, as you would in the case of an ordinary gas company, I do not think it would come under that law at all.

The President—I think you will all agree there is one clause in the first part of this question that does not state the situation properly as it is in Ohio. There are no exclusive franchises granted in Ohio. It is different from the law in Pennsylvania in that respect. While from the nature of the situation it may become of an exclusive character—that is, it may not pay another company to come in and compete—yet our statutes expressly prohibit the granting of exclusive charters.

Executive Session.

The President—This closes our open discussion, gentlemen, and the Association will now go into Executive Session, at which only members are permitted to be present.

After calling the Association to order, in Executive Session, President Boyle said: Gentlemen, we will first discuss, in Executive Session, questions in the Question Box relating to acetylene gas, which are Questions No. 3 and No. 6.

Question No. 3.—"What effect will acetylene gas machines have on gas companies?"

Question No. 6.—"Has any method been discovered (that is economical and free from danger) for using calcium carbide or acetylene as an enricher for illuminating gas?"

An extended discussion on these topics was then had, which was participated in by Messrs. Boyle, McDonald, McIlhenny, Holmes, Templeton and Thompson.

The President—We will now take up the subject of the Welsbach burner, and in this connection we will consider the following questions in the Question Box:

Question No. 1.—"Is natural gas growing as a competitor of manufactured gas when used in Welsbach burners?"

Question No. 7.—"What progress is being made by the Welsbach Commercial Company in protecting its agents from competition due to the so-called infringing incandescent gas lamps?"

Discussion on these subjects was indulged in by Messrs. Hess, McDonald, Doherty, Chritchlow, Eaton, Stephens and McIlhenny.

Disbanding the Advisory Committee.

The matter of the continuation of the Advisory Committee was then made the subject of a discussion, which was participated in by Messrs. Whysall, Greenough, Schmidt, Boyle, Welch and Butterworth.

It was moved by Mr. Butterworth that the Advisory Committee be continued in existence until it ascertained its indebtedness, had collected the money from the various gas companies and paid its indebtedness, and that the Committee then be discharged. (Not seconded.)

Mr. Greenough.—As no one seconded Mr. Butterworth's motion, I offer as a substitute motion the following: That the Advisory Committee be disbanded at once and that their accounts be turned over to the Executive Committee of this Association for settlement. (Seconded; carried.)

It was then ordered by the Association that the Advisory Committee heretofore appointed be at once disbanded and that their accounts be turned over to the Executive Committee of this Association for settlement.

The Executive Session having been declared closed, the Association was reconvened in open session. The President called for the

Report of the Committee on Memorials,

which was read by Mr. W. C. Hedges, as follows:

Whereas, Divine Providence has removed from our midst Sharpless E. Bird and George S. Harris, members of the Ohio Gas Light Association;

Therefore, Be it Resolved, That in the death of Sharpless E. Bird and George S. Harris this Association has sustained an irreparable loss, a loss which we deeply feel and greatly deplore.

William C. Hedges,
John D. McIlhenny,
A. D. Cressler,
} Committee.

On motion, duly seconded, the report was adopted and ordered spread upon the minutes of the Association.

The President called for the

Report of the Nominating Committee,

which was read by Mr. Eugene Printz:

Mr. President: Your Nominating Committee beg to report the following for officers of the Association for the ensuing year:

President—Mr. B. P. Holmes, of Youngstown, Ohio.
Vice-President—Mr. E. H. Jenkins, of Buffalo, N.Y.
Secretary and Treasurer—Mr. T. C. Jones, Delaware, O.
Executive Committee—Mr. W. C. Boyle, of Salem; Mr. E. S. Templeton, of Ashtabula; Mr. A. P. Lathrop, of Columbus; Mr. Geo. H. Tayler, of Warren; and Mr. W. C. Hedges, of Mansfield.

Respectfully submitted,

GEO. W. MCCOOK,
E. H. JENKINS,
E. PRINTZ,
} Nominating Committee.

Mr. Printz—Mr. Jenkins at first objected to signing the report because the report named him as Vice-President, but the Committee finally persuaded him to affix his signature. He agreed, however, to all of the other names without objection.

ELECTION OF OFFICERS.

The Secretary—Mr. President, I see that the Committee have named five members of the Executive Committee, whereas only two are named ordinarily. I presume one of the five was named to take the place of Mr. T. C. Jones, who will retire as a member of the Executive Committee upon assuming the duties of Secretary and Treasurer. Therefore, one of these names ought to be suggested for the short term to take the place of Mr. Jones, and then two names suggested for long term.

Mr. Printz—It is understood that Mr. Boyle is a member of the Executive Committee, and Mr. Templeton holds over; Mr. Tayler and Mr. Hedges being the new members of the Committee. Mr. Lathrop will take the place of Mr. Jones.

The President—This report is before you for your action as modified. That is that Mr. Lathrop be elected for the unexpired term of Mr. Jones, and that the new members, Mr. Hedges and Mr. Tayler, be continued for the full term.

Mr. McIlhenny—I move the adoption of the report, and that the Secretary be authorized to cast the ballot of the Association for the officers therein named. (Carried.)

The Secretary—I take pleasure, gentlemen, in casting the ballot of the Association for the election of the member for the short term, as well as for the rest of the gentlemen nominated.

The report of the Committee was then adopted and the officers therein nominated duly declared elected.

Mr. Jenkins—There is a minority report of that Committee, but you, gentlemen, will see that I waited until the Vice-President was elected before I offered it. We want to say that the Committee did their very best to persuade Mr. Lathrop to continue in the position of Secretary and Treasurer of the Ohio Gas Light Association. The Committee I think voice the sentiments of every member of this Association when we commend his faithful and earnest efforts in the position of Secretary for several years. We all know that the success of the Ohio Gas Light Association is largely due to the man who holds the position of Secretary; and I, for one, wish to offer a motion that, by a standing vote, this Association extend a hearty vote of thanks to the retiring Secretary and Treasurer. He simply declines to serve any longer in that capacity because he has so many other engagements to fill that he can not possibly devote the time required by the position.

Mr. Jenkins' motion being duly seconded, was carried by a unanimous standing vote.

The President—I can certainly voice the sentiments expressed by Mr. Jenkins. No person who has occupied the position I have during the last year can fail to appreciate the services of Mr. Lathrop to the Association and to his associate officers.

Mr. Lathrop—Gentlemen, I sincerely thank you for this expression of approval of my work as Secretary. I would state that I have tried to do all I could to make the meetings of the Association a success, and I hope you will all do everything you can to assist Mr. Jones in the duties which he will be called upon to discharge. It is a position which, to be filled properly, requires the co-operation and assistance of every member of the Association. While I am confident that every member of the Association wants to help the Secretary as much as he can, yet, even with such assistance, the duties of the position are arduous and require constant attention. I, therefore, bespeak for Mr. Jones your hearty co-operation. I hope for Mr. Jones' sake, as well as for the Association, you will all do whatever you can to render the duties of the Secretary as light as possible.

Mr. McIlhenny—I think it is proper also to express in some way the appreciation of the members for the valuable services given and the labors devoted in the interests of the Association in general by all of the officers and committees during the past year. They have provided for us a most interesting programme, one from which the members who have attended this meeting feel that they have gained much profit and benefit. Therefore, I think an expression of approval of their conduct is not only at this time proper, but should be given with the best of goodwill and with the feeling that the Association has been fortunate in the selection of such capable and efficient officers.

It was then moved, seconded and carried that a vote of thanks be tendered to the retiring officers of the Association, including the committees.

Mr. Jones—Mr. President, I fully appreciate the responsibility resting upon me when I assume the duties of the position to which I have just been elected, and I especially feel that responsibility when called upon to carry on the work which has been so long and so successfully performed by Mr. Lathrop. But with the promises I have received of valuable assistance from each member of the Association I feel that the work in a large measure will be reduced. I accept the position to which you have seen fit to elect me, and thank you for your expression of goodwill. (Applause.)

The President—I know Mr. Jones so well and have been acquainted with him so intimately upon the Executive Committee that I have no doubt the Ohio Gas Light Association will not suffer in the shift from Mr. Lathrop to Mr. Jones. I will announce the Committees recommended by the report of the Committee on President's Address, as follows:

Committee on Coal Tar.—Messrs. Irvin Butterworth, Columbus, O.; Eugene Printz, Zanesville, O.; Emil G. Schmidt, Sandusky, O.

Committee on Statistics.—Messrs. George Whysall, Dayton, O.; Charles H. Welch, Athens, O.; George Treadway Thompson, New York City.

Committee on Municipal Control.—Messrs. C. R. Faben, Jr., Toledo, O.; Fred R. Persons, Toledo, O.; Jerome Penn, Washington Court House, O.; A. P. Lathrop, Columbus, O.; E. P. Callender, New York City.

I have made the Committee on municipal Control larger than the other committees, having it consist of five members instead of three, and from different sections of the country, in order that they may have better facilities for doing their work.

FINISHING THE QUESTION BOX.

The President—One or two questions have been omitted, and it is for you to determine whether you desire to discuss them now.

Question No. 11.—"What prospect is there of the price of tar advancing, and what is the cause of the present low price of that product?"

As we have appointed a committee on coal tar, and unless some of the members present desire to discuss that question now, it might be referred to that committee.

Question No. 12.—"What is the prospect of better prices for ammoniacal liquor?"

Is there anything to be said upon these subjects?

Mr. McIlhenny—Does anyone present know the value of tar per barrel for burning under the benches instead of coke? Is anyone's experience equal to stating the value of tar as compared with the value of coke for use under benches?

Mr. Greenough—I have had some experience, and the old rule applied in New England was substantially that it took 2 gallons of coal tar to be worth 1 bushel of coke. I have often heard Mr. Sherman, at the New Haven (Conn.) works, and who is a very practical man, say he would always burn coal tar if he could not get $2 per barrel for it. It depends a good deal upon how the plant is situated. If you are in a closely settled district with residences about you, I think it will hardly be advisable to attempt the burning of coal tar to any great extent. I have spent a great deal of time in endeavoring to utilize coal tar in this way, where we had no market for it, but I have never succeeded in burning it so that we did not get more or less smoke, and I think we spent about as much money in repairing the wall paper and furniture of our neighbors as we ever made in burning coal tar. It can be done very well, however, where you are not situated in a densely populated district. It furnishes a very strong heat, so strong that it will burn your retorts out if you are not careful with it. There is no question as to its value.

Mr. Doherty—Has anyone had any experience in burning coal tar in half-depth or full regenerative furnaces, similar to the Bredel and the Mitchell? And, if so, whether they have experienced any trouble from deposits in the recuperative flues?

Mr. Greenough—If I remember rightly, it must be ten years since I had anything to do with it. We used the Watertown burner for burn-

ing tar, with a little needle point with which you could reduce the flow of the tar. If you can get perfectly clear coal tar it can be made to burn very easily. But you know perfectly well that all tar is bound to be lumpy, and you have to give the closest attention to the working of the needle to keep the flow steady and even. However, it can be done, but I never succeeded in doing it so that occasionally we did not get some smoke.

Mr. Doherty—Is that a steam injector?

Mr. Greenough—Yes, sir; I think it is advertised now in the AMERICAN GAS LIGHT JOURNAL.

AN ACKNOWLEDGMENT FROM THE PRESIDENT-ELECT.

The President—If there isn't anything further to be said upon this subject, gentlemen, I will now call upon our President elect, Mr. Holmes, for a little speech.

Mr. Holmes—Gentlemen, and members of the Ohio Gas Light Association: I can hardly express to you my grateful acknowledgment for the honor that you have conferred upon me in electing me your President for the ensuing year. When I look over the list of talent that has preceded me, I feel myself inadequate to perform the duties satisfactorily. For fear that this might be the case, I trust that you will all give both the Secretary and myself your enthusiastic co operation in the work of the Association for the next year. I am very well conversant with the capabilities of the associates in office that will work with me this year, so I think there is very little doubt about the success of the Association, regardless of the capabilities of the President. While sitting here it has occurred to me as a matter of interest—I do not know whether to the rest of you or not—that it was in this very city I first became interested in artificial lighting. It was I think perhaps 20 years ago that I helped to form a Society in this city for the study of electricity and its uses; we were nearly all telegraph operators at that time. About that time Mr. Brush first commenced lighting the streets of Cleveland with his arc lights, and on that occasion—perhaps there are some here who were present at that time—you could see thousands of people standing in the public square, trying to read newspapers by electric light for the first time. The greatest use of electricity in those days was supposed to be in an effort to annihilate gas. It was not long after that when I engaged in the business. I suppose it is unnecessary to say that we did not do much in the annihilating business. It led, however, to my being interested in the gas business and ultimately to my becoming a member of this Association. I wish to acknowledge here the help that I have gotten from this Association. The encouragement and help which I have received from these annual gatherings have been of the greatest assistance to me in my business, and I think perhaps you have recognized that fact to-day in electing me as your President for the ensuing year. I thank you very much. (Applause.)

The President—I wish to thank the members of the Association, both for myself and for Secretary Lathrop, for the interest, attention and earnestness they have shown in this meeting. I think it has been profitable to all of us. The benefit derived from these annual meetings is not alone to be obtained from the proceedings of the Association during its sessions, but as well in the talks and conversations that the members indulge in in the lobbies and halls while the convention is not in session.

Gentlemen, I now declare the Fourteenth Annual Meeting of the Ohio Gas Light Association adjourned *sine die*.

PROCEEDINGS OF THE MEETING OF THE TEXAS GAS AND ELECTRIC LIGHT AND OF THE TEXAS STREET RAILWAY ASSOCIATION.

HELD AT LAREDO, TEXAS, MARCH 9TH to 12TH, 1898.

FIRST DAY, MARCH 9—MORNING SESSION.

The meeting was called to order by Mr. L. T. Fuller, of Calvert, Texas, President of the Texas Gas and Electric Light Association. Mayor Christen, of Laredo,

WELCOMED THE DELEGATES

as follows:

Friends and Fellow Citizens: The city of Laredo bids me greet the stranger within our gate, not as a foreigner, but as a guest and friend, for whom nothing that we have is too good; and never was a behest more gratefully obeyed. When I say "Welcome" I would wish you to understand it in that generous hospitality that it bears in our own south land. We shall endeavor to bear substantial testimony to the fact that we are not unmindful of the compliment and honor bestowed upon us in the selection of our city for your convention. These words, my friends, are not addressed to you as lip tricks, and in no spirit of time serving or apology.

The marvels of your electric currents outrival all the magic of necromancer and alchemist. You are compelling nature to reveal the secrets which she has so artfully concealed. Your science is the magnet of our times. It woos the thinker and the worker alike; it opens careers and pays rewards of dazzling brilliancy. Ever since Edison has made our life almost automatic, and your science so alluring, devotees have been flocking to it by the thousands.

The marvelous triumphs of electricity have been as beneficent as they are great. You have in myriads of ways ministered to our comfort. You are the benefactors of our race and the civilized world is gazing with amazement upon the wonders of your inventions.

My friends, I shall not trespass further upon your attention. You have heard that Mr. Lincoln, when called upon by a body of clergymen to suggest certain measures during the war, said to them that "Most words he listened to in life generally reminded him of something, but what they had said did not remind him of anything." But the scientific men that I see before me to-day remind me of something indeed; and I had begun the preparation of an elaborate address to tell you of the great things of which you reminded me, but the atmosphere became so suddenly charged with electricity by your arrival that Mr. Yeager's wires became crossed and we were enveloped in utter darkness; and as I am constitutionally opposed to working by lamp light, I resolved to cut my speech short and to confine myself to wishing you, one and all, a most hearty welcome.

The following response to Mayor Christen's words of welcome was made by Mr. Carl F. Drake, President of the Texas Street Railway Association:

Mr. Mayor, Chairman, Ladies and Gentlemen: It has been my pleasure during the last 20 or 25 years to attend many conventions, in almost every clime. Scarcely a State, from the Atlantic to the Pacific, from the Canadas to the Gulf, that has not extended to me, as a member of some associate body, a welcome; but never until about one year ago did I appreciate what true hospitality means. Ordinarily the Mayor, or some eloquent orator from the city, gets up and offers you "The key to the situation;" tells you that you are a good fellow; that he is glad to have you with him; then he puts on his hat and goes home, and you can be with him, or be in hades, so far as he is concerned, from that time on. But last year it was my pleasant duty to preside over an organization in your sister city of the Rio Grande, El Paso, and there I learned what true hospitality meant. The Mayor, the orators, and the people came; the rich, the poor, the high and the low, extended to us the right hand of fellowship, and when they once grasped our hands they held them for one solid week. There was nothing in the city but what was ours—it belonged to us in spirit; and no word of welcome was uttered from the stage but was a word that meant an honest and sincere expression of the heart's desire. And it all taught me that you people of the Rio Grande have a peculiar way of welcoming your guests—peculiar in its earnest hospitality, peculiar in its honest and sincere meaning—and we feel that when we come here and look into the sluggish waters of the river, every rippling wave as it wanders down between these tall banks throws a kiss to the stranger, and echoes, "Welcome, stranger." The very flowers in the morning, as they turn their ruddy cheeks to the sunlight, bend and open their soft petals to us to kiss, saying: "Welcome, stranger; welcome!" The people have become inspired with this universal sympathy; whether it is because your people are so thoroughly cosmopolitan, or whether it is indigenous to the climate, or whether there is something in the little Rio Grande Valley that produces it, or whether it is the heart-feeling that was left to you by the old heroes who first populated it, I know not; but the feeling is here, and we appreciate it. And I want to tell you, Mr. Mayor, that nowhere on earth would I rather go to attend a convention than here on the Rio Grande, whose narrow thread of silver divides two of the grandest nations on earth to-day. (Loud applause.) Where in the civilized world can we find two sister republics working in harmony and sympathy as you, the sons of Montezuma, and we, the colder men of the Northern lands?

We send our sons with the blonde hair to mingle with the dark hair of your daughters; and we hope the blush on the cheek of every Mexican maiden may be of joy when the man of the cold climate says, "Sweet sister, come," and thus make another link that will join together the greatest of the republics of to-day.

I can only say to you, Mr. Mayor and hosts, that we thank you for your hospitable sympathy, but I must confess that it is not unexpected. I came here expecting it, and had I not found it I would have thought that the lesson I learned about a year ago was something that could not

be carried on further down; but from what I know of last night's experience, and of the programme in the future, we are certainly going to have a week that will surpass any other week that the electrical people have ever seen in any convention assembly in Texas.

One word to the people who come from the far Northern clime. We bid you welcome to our midst—for I feel that I am, in a measure, a citizen of Laredo; we bid you welcome to this soft and easy climate. When the storms and chilly winds close you in up there, come down here and learn something of how to live. We don't live as hard, we don't live as fast, perhaps we don't work as hard, we may not be quite as aggressive and progressive; but we will live a longer, a pleasanter, a sweeter life, and when the Last Day comes and the great book is closed, we can lay down our life's work feeling that we have not lived for gain alone, but, as well, for ourselves, for our fellow-man, and that our fellow-man has had a part in every day of our life's work. (Great applause.)

M. Antonio de la Fuenta (a Mexican delegate) then addressed the Convention as follows:

Mr. Mayor and Messrs. Delegates: The link that unites and binds together and narrows the distance between two nations is brotherhood; the beacon that shines on the pathway of progress is the light of intelligence; and the direct road to prosperity is the pathway of labor. To-day one of the cities of our Brother Republic opens, with unusual ceremony, the doors of one of its temples, raised to the skill and ingenuity of its children, to receive us, as brothers and participants in the last secrets drawn from science.

I am pleased to perform the honorable commission of expressing the most sincere gratitude, in the name of the Mexican delegates, to the Mayor of the City of Laredo for the cordial greetings with which he has saluted our arrival into the country of the immortal Washington. At the same time I take pleasure in extending the kindest expressions of gratitude to the initiators of this convention, in which the Mexican delegates join me with feelings of admiration, respect and fraternity. Of admiration, because this is due to all that is great and wonderful; of respect, because homage is due to the conqueror of one's own requirements; of fraternity, for the union and sympathy that bind the relations of the Brother Republics into greater cordiality each way—a union that we should conserve and encourage between the citizens of the two countries with the same veneration that we revere the memory of our beloved ancestors. (Applause.)

President Fuller responded to Senor de la Fuenta's remarks as follows:

Senor Antonio de la Fuenta and our Guests of the Brother Republic of Mexico: It is with pleasure we greet you to this, the fourth annual meeting of our Association. We assure you we feel highly honored by your presence among us, and hope that your visit will not only be a pleasure to you, but that you may profit by this meeting and in it find something that may be useful to you.

We must nevertheless remind you that ours is a young Association, but in our membership you will find representatives of the principal gas and electric light power plants of our State; and some among us represent the great industries of the United States. You will also find that a great many of our principal manufacturing industries are represented in the display and exhibit which you will be shown. The papers that will be read in your hearing we hope may be of interest to you, and it will be a pleasure to have you enter into the discussion of same. We desire to have the pleasure of numbering you among our membership at this, the beginning of our first International Association meetings, and hope it will redound to our mutual interest, and that you will lend your aid and kindly proffered endeavors in building up an Association that we may all feel proud of in the future.

At the first inception of this international meeting, it was unanimously agreed by our Executive Committees to invite you; and again I assure you we feel by your presence that we have been honored. We thank your Consul, Senor P. Ornelas, at San Antonio, and the Minister of Foreign Affairs of the Republic of Mexico, for the kindness shown and interest taken in aiding us in bringing about this meeting; and also have to thank the Senors in the several States that have so courteously aided us. We have to regret that the time was so short that some of them could not accept the invitation and be present with us.

Now, gentlemen, as the Honorable Mayor of the City has so kindly tendered to you and to us the hospitalities of the city of Laredo, we turn you over to the membership and to the several committees, and hope you will feel at home among us.

The Association then adjourned, to reconvene at 2 P. M.

FIRST DAY—AFTERNOON SESSION.

The President called the meeting to order, pursuant to adjournment. On motion the minutes of the last regular meeting of the Texas Gas and Electric Light Association were adopted, as published in the AMERICAN GAS LIGHT JOURNAL. The Executive Committee reported the names of several applicants for membership. The report was accepted and the Secretary cast the ballot of the Association in favor of the election of the gentlemen proposed. President Fuller then delivered the following

INAUGURAL ADDRESS.

Gentlemen of the Texas Gas and Electric Light Association and Our Guests from the Sister Republic of Mexico: It is with pleasure that I greet you at this, our fourth annual meeting, in the Border City of Laredo, which was unanimously selected at our last meeting, after the reading of the courteous invitation of the Hon. L. J. Christen, Mayor.

I wish also to congratulate the members on the health and growth of the Association, and in the interest manifested in our advancement by its members, as there has been no great innovation in the business in which we are engaged the past year.

I will confine my remarks to a general review of the year just past and to a few recommendations for the future.

Since our last meeting the idea was conceived by a few of our members, and several members of the Texas Street Railway Association, that, as our interests were somewhat mutual, at least so far as generating power by electricity is concerned, we might join our annual meetings, at least to have them at the same time and place, and on such business as was mutual we could have joint sessions of the two bodies. After a good deal of correspondence on the subject, with officers and members of our Association, and likewise with the officers of the Texas Street Railroad Association, we decided that we would call together a special committee, appointed from our members and also from the membership of the Texas Street Railroad Association, and all the members of our Executive Committee, to meet at Austin, Jan. 17th. In response to said call our Association was represented at said meeting by T. D. Miller, G. H. Cushman, J. H. Fitzgerald, Chas. F. Yeager and your humble servant, and I regretted we did not have the pleasure of the balance of the committee with us. The Texas Railroad Association was represented by Mr. Carl F. Drake, its President, R. S. Wakefield, F. E. Scoville and C. L. Wakefield, and as to the action there taken, I refer you to minutes of said meeting that have been read in your hearing. Suffice it to say, all necessary arrangements were made and completed, as far as joint committees were concerned, and I am pleased to refer you to the meeting as to the success of the earnest work performed by said committees. At the meeting of the said executive and special committees it was further agreed that we make our Associations international, and to invite all the citizens of Mexico interested in the street railway, gas or electric light business to unite with us and to be present at this meeting. Through the kind and earnest help of Senor P. Ornelas, Consul at San Antonio, and the kind help of numerous friends in the different States of Mexico, invitations were extended, but I regret that we did not have ample time to have gotten out the invitations sooner. We have had quite a number of encouraging letters, but regretting the inability of the writers to attend, owing to shortness of time.

But, nevertheless, we are highly gratified to have those present from our sister Republic with us, and hope that they may enjoy our session and that it may be of mutual benefit to them; for the papers that are to be read at this meeting, from the known ability of the gentlemen who are to present them, cannot fail to be instructive.

The great depression in business throughout our State has not given much encouragement for new enterprises in our lines; but I am gratified in saying that I believe all have had a fair share of business, and have managed to at least make ends meet. To maintain or increase our businesses through these trying times we have been taught many ways of economy, as well as the development of much energy in the introduction of ways and devices of maintaining our trade, that in former years were not thought necessary. I feel that our friends in the gas business have been profited by our Association; and the reading and discussion at our last session, of "Gas as Fuel," brought out the fact that our friend Miller had found a way to make cheaper gas. He said: "The use of Corsicana oil does the business." But I regret to say I do not know of any electric light men having been able to cut the cost of generating current so as to make reductions in prices—if they did, they would not want to acknowledge it, but would want all they could get to meet the competition of the gas man with his Welsbach burner. There is a well established rule that prices once

reduced on gas or electricity, for lighting, fuel or power purposes, to the public, it becomes an impossibiiity to advance prices, if necessity should require.

There is also throughout our State a general expansion and growth of our cities and towns, and a tendency of the population to get out in the suburbs, from the crowded portions of the cities and towns, which means quite an item for extensions to gas mains and electric service wires; but the cost of all kinds of material is not now so much an item as in past years. In fact, the question with most of us is, does it pay to make the extensions and keep up with the growth of the city or town in which we may be located?

I would suggest to our Association that each company throughout the State file with our Secretary each year, about 30 days before the annual meeting, a schedule of prices they are charging for gas for all purposes, and electric lights, either arc or incandescent, and power furnished—also, any rules or regulations governing the output—that they may have published, these to be the property of the Association. If we should think it advisable we might have the same tabulated and published for the benefit of the members of the Association, also giving capacity of all plants and appurtenances they are working, and each year all changes and improvements. This, if kept up, will give us a complete history of all the plants in the State; and, gentlemen, we must work together, for the army of schemers are always on the look out to induce capital to put in new enterprises to furnish new kinds of gas for less money, although dangerous any or all may be. We have to be on the alert to checkmate these new fangled ideas. As gas and electric light people we have to fight these schemers, for they are now endeavoring to put into all the stores and family residences, complete gas plants, backed with all the ironclad guarantees possible to make; and, strange to say, they find some victims.

I also wish to recommend that steps be taken to amend our constitution to the end that this be made an International Association, and that its membership be extended to our Sister Republic of Mexico, and the States of Arkansas, Louisiana, Oklahoma and New Mexico, and that our by-laws be made to conform to same.

You will hear the report of our Secretary and Treasurer, which I hope will be satisfactory to you and show our growth. While we have had rather more expense than I would have desired, it was unavoidable, and I assure you was incurred only as we thought that it would redound to our benefit. I wish to congratulate you on the selection of AMERICAN GAS LIGHT JOURNAL as your official organ, and refer you to the printed proceedings of said meeting to show the efficient manner in which they published the same.

I wish to thank the several committees for the efficient work done by them, and desire to say that Mr. W. E. Holmes, our efficient Secretary, has been diligent and persistent in his efforts and untiring in directing the enormous work that has devolved upon him. I found him ever ready to do all things necessary to the advancement of the Association. I also wish to thank the citizens of Laredo, their Honorable Mayor, and the gentlemen of their several committees for this meeting in their city, and especially acknowledge our indebtedness to my friend, Mr. C. E. Yeager, for his untiring energy, push and vim, which make this visit to the city of Laredo one that will cause us all to carry home with us many delightful recollections.

In conclusion, I wish to express a sentiment that seems to me to suit the occasion, as uttered by the President of the Hardware and Metal Trades, at its ninth annual dinner in New York: "There once stood a statue in an ancient city, with two faces, and my imagination has pictured the backward looking countenance as scarred and torn with conflict of the past, its expression that of disappointment, defeat and despair; but the forward looking face is bright with a smile of hope, and eyes flash with eager expectation. So I say to the young men here, look to the future and not to the past; you in whose heart is that thirst for achievement, which is the prerogative of youth; you who dare all and fear nothing. It is to you the nations look for the accomplishment of their destiny. Some of us stand in the afternoon shadows, with our faces toward the sunset; let yours be bright with the promise of the coming day. See to it, see to it that in the future truth and honor and justice shall prevail in our nations' lands. See to it, see to it that the Governments of our nation, States, cities and towns be administered in righteousness.

"Let your watchword be 'God and our country;' and when you have graven this deeply in your hearts then all the sordid and petty things of time shall be swept away in the passion of patriotism that shall fill your souls; and then and then only will you have vindicated your right to be called citizens of the great republics."

On motion, Messrs. Miller, Monroe and Cox were appointed a committee to consider President Fuller's address and report upon its text.

Mr. Carl F. Drake, President of the Texas Street Railway Association, read his annual address to that Association, which was suitably disposed of. Mr. Drake then read the following paper on

ASSOCIATE WORK.

The Good Book teaches us that God created man after His own image. If He had also given us those other attributes that go to make up a perfect creature, we should have but little reason to discuss the question of associate work, or to consider the evils, as well as the benefits, that arise from a concert of action amongst those whose interests harmonize.

Associate work is as old as history—yes, even older than written history; and, so far as modern times are concerned, when the first bright rays of civilization cast their glinting beams on the dark ages of barbarism, when the semi-barbarous tribes of Europe began to feel the warmth of the new and better life, associate work was found necessary. First, the traders and the crude artisans joined together for mutual protection as against the neighboring tribes; then the masses organized to protect themselves against the more powerful owners of the lands; then certain classes of mechanics and artisans associated themselves together to protect some trade secret or particular style of workmanship. These latter organizations—guilds, as they were called—soon spread over Europe, and, particularly in the northern countries, became important factors of government; and so on down. The laboring classes, the commercial elements, and the very government itself, found the corner stone on which to erect the structure of success in associate work. As long as organized labor has been confined to the honorable upbuilding of trade, commerce or good government, so long has associate work been most valuable; and if it had been confined to these channels there would have been but little use for us to discuss the advantages and benefits to be derived from organization; but, unfortunately, like many other of the choicest gifts to man, the power that comes from a concert of action has so often been abused that even the most innocent organizations, formed as is ours, not for gain or to foster the interests of any man or class of men, but rather as an educational institute, is looked upon with suspicion, and its actions closely watched by every shyster politician who hopes by this means to further some personal interest, even at the cost of the betterment of our people. This, my friends, is not confined to our own country, but wherever the touch of liberty has opened the gates to discussion.

Now for a moment let us consider the reasons why we must defend as well as advocate associate work. As far back as the ninth century we find associate work in the feudal system, which is the foundation of our present form of government. Associate work was necessary for protection and development, but as the lord grew strong and waxed rich from the labors of his vassals, the old Adam developed and caused him to take advantage of his stronger organization to overthrow his neighbor, and thus the story of evil results from the purest and best inceptions. And from that day the same unfortunate principles, or rather, the lack of principles, have caused man to pervert these good things for pernicious and unlawful purposes. Such is the history of man's ambition, and often of his downfall.

Early in the sixties trades unions sprang up in England, fostered and encouraged by the government, and were doubtless of much benefit to the laboring classes; but, unfortunately, as they grew stronger there was but a repetition of history. Their power became such an important factor in commerce that it was found necessary for the government to appoint a commission to examine into the *modus operandi* of the trade organizations. This resulted in the enaction of laws, in '69, '71 and '75, defining their rights and prescribing the limits to which they might combine, and how far their acts were lawful. Germany, France and Italy have also found it necessary to deal with these questions in a more or less severe measure.

Of the darker side of associate work in our own country, about the first combination that proved a menace to society and threatened our commercial interests was that horrible organization, formed amongst the coal miners of Pennsylvania, known as the "Molly McGuires." Horrible in its inception, dangerous from its birth, it took most severe measures to suppress it, and did more harm to labor and kindred peaceful organizations than can be eradicated by a thousand useful deeds. Perhaps the next most dangerous was that created by one Debs, who boasted but a year or two ago that at his word a million men would lay down their tools, and so hamper the wheels of commerce that the world of business must accede to his most outrageous demands; and while scarcely 5,000 answered to his call, yet a trail of blood was

left behind, and many widows and helpless children even to-day cry aloud against a crime perpetrated under the name of peaceful organization. But enough of this. We have endeavored to illustrate the evils that may arise from the vicious use of a most worthy method, where the greed for power or the hope of gain may cause trouble and disaster when placed in the hands of the avaricious or the ignorant.

Now let us look at the other side of associate work, and the advantages that may be derived from a proper use of its powers. The very foundation and corner stone of every christian and civilized government is based upon organized efforts, and no nation exists to-day that cannot trace its origin and progress to associate work; and if we but had the time to compare the growth of the recognized nations of the world we would find that the ratio of united action measures the amount of development attained. The two grandest examples of the present age, the United States and her sister Republic of Mexico, are lessons of associate work that will live so long as history shall live. Divided as we are into municipalities and States, for the better management of local affairs, we are each a grand association for the purpose of better government, furnishing a larger field for development and better protection to our citizens. In our own country, the Brotherhood of Locomotive Engineers and the Knights of Labor, as operated under the guiding hand of Mr. Powderly, together with the hundreds of commercial clubs and kindred organizations, all bear witness to the wisdom of and the benefits to be derived from associate work. Associate work has, by its fostering care, given to us the greatest gems of art; by its support and encouragement developed for our use the best thoughts of man. It has builded well of church and school; it has been the best friend of the scientist; it has brought together the greatest minds of the world; and, by an interchange of experience and the introduction of new thoughts, has given to us the wonderful development and advancement of the Nineteenth Century. Individual minds must, of a necessity, if much work is accomplished, labor in a single channel; and the collection of these ideas by association is what gives the world the best and greatest results. They formulate and prepare, then, by the aid of associate capital, theories that become facts. What individual would have linked the Atlantic to the Pacific with an iron bond that makes Orient and Occident almost one?

What single person had the power to wrest from savage hands the broad plains of our loved nation and offer them up to the sturdy frontiersman? Who, without associate work, could have turned these wild lands to the richest gardens, with a wealth of products that feed and clothe the world? Who would have dared to link all nations together with a wire, each moment pulsating with the news from every corner of the earth? And so on we might at length illustrate the advantage of working together. Yes, my friends, we live in an age when man must realize that he is but an atom in the march of progress; we must realize that no matter how stalwart we may be we cannot combat with the wave of associate work.

We meet here to-day as the representatives of two organizations, whose members have taken up for their life work the study of that wonderful power, the effects of which we know so much, but of its origin and the limitation of its power so little; a power that we have chained by but a slender thread. We know that it is all powerful, but from whence it comes or what its limits are, we know not; we still grope in the darkness of theory, with but a limited application. These gentlemen who have made particular branches of the work their study, come to tell you of the knowledge that they have gained, to interchange their varied experiences, realizing that by association each may help the other to a better understanding, so that we may all be more useful and successful workers. Who can for a moment question the great benefits of a concert of action? Who can say in honesty that the benefits do not far exceed the evils that arise from men forming themselves into organized bodies? Why, the very organizations such as we represent are necessary to hold in check and to overcome the evil effects of man's greed. Civilization, church, state, science, the arts—all demand the best efforts of man, and as man singly cannot combat with the demands of the progressive age in which we live, therefore, the peculiar necessity for combined effort. So let us active workers upon whose shoulders rests the responsibility of writing the last pages in the great book of the Nineteenth Century so unite our efforts that our children and our children's children, when our life's work is over and they are called to add their chapter to the history of the new century, may look back upon us and our work with pride and satisfaction that can only come from gleaning the best thoughts, separating the chaff from the wheat, and in the great mill of associate work bringing forth the richest proceeds garnered from the experience of a century that will then be dead.

Discussion.

Mr. Miller—This paper is, of course, of interest to all of us. As a gas man I am gratified to know, after hearing Mr. Drake's paper, that there are no agnostics amongst the electric men. They deal in something of which they know little or nothing; they do not wait for a demonstration of what they have before they will accept it. I might draw a comparison, but I believe comparisons are odious, as a rule. The force of Mr. Drake's argument is one that cannot be impeached or attacked; he has covered the ground. That is to say, if there is any other ground our history doesn't give it. We know that associate work started very early in life, because after Eve ate the apple she got Adam to join her.

Mr. Cox—It has been suggested that as one of the main features brought out by Mr. Drake pertains to labor organizations, this might be a very good opportunity for him to give us a little further light on the matter regarding the method which he thinks best for the controlling of such organizations. It seems Mr. Drake intimated something of that kind, although it was more intimated than expressed.

Mr. Cushman—I think a discussion of how to control labor organizations would be entirely a side question, and so would not bear upon the subject matter before the convention. I don't think Mr. Drake intended to bring up anything in regard to the control over labor organizations.

Mr. Drake expressed himself as desiring the permanent union of the two Associations.

Mr. Miller—It is suggested that we get an expression of the Association as to whether the Committee on President's Address should also take up this matter of consolidation of the two Associations. I mention it because we would like to know what the will of the Association is.

President Fuller—What is the pleasure of the Association on that subject. Do you wish to refer to committee the remarks of Mr. Drake in regard to uniting the Texas Street Railway Association with the Gas and Electric Light Association.

Mr. Drake—Regarding the question of the amalgamation of the two Associations, I prefer that that be carried over for a day or two, as I understand several other of our delegates will be here to-day and to-morrow. I didn't speak in my official capacity as for the President of the Texas Street Railway Association, but simply spoke for myself as a member of it. I prefer to have a consultation with our members as to how they feel about it.

On motion the Committee on President's Address was empowered to act upon the question of consolidating the two Associations, the Committee to confer with a committee appointed from the Street Railway Association, the latter committee to be named later by Mr. Drake.

On motion of Mr. Monroe a vote of thanks was voted to Mr. Drake for his paper.

On motion the convention adjourned until 8 o'clock P. M.

(To be Continued.)

The Heat Developed During Purification by Means of Weldon Mud.[1]

Attempts have been made in the *Journal* to deduce from thermochemical data the amounts of heat which may conceivably be liberated during the fouling and subsequent revivification of oxide of iron. From the results of the computations of the heat liberated, the temperatures which might supervene in oxide purifiers during use, and in the revivifying mass, were calculated. The natural limitations of the methods of computation which were used were recognized and indicated. It was, however, stated that even the necessarily inexact calculations made might be of considerable service. An instance of the application to useful ends of the rather academical reasonings and speculations indulged in in the articles referred to, may now be offered.

It has frequently been asserted, in general terms, that the affinity of the manganese dioxide of Weldon mud for sulphureted hydrogen is more marked than that of the ferric hydrate of bog oxide for the same gas; and that both in fouling and revivification, Weldon mud acts more vigorously than bog oxide. The statements as to the relative vigor of the action of Weldon mud and oxide appear to have been based chiefly on rough observations of the temperatures which arise during the fouling and revivification of the materials under working conditions, or in laboratory trials in which the latter conditions were as nearly as possible simulated. Apart from the fact that the methods of observation usually consisted merely in applications of the hand to the

1. From *Jour. Gas Lighting*, March 22.

material or to the exterior of the containing vessel, or at best in the insertion of a thermometer in masses of uncertain dimensions and degrees of dampness, reasonable objection may be taken to the rough-and-ready practical test, on the ground that it affords no guarantee that the materials were tested under conditions equally favorable to both. For instance, a special preparation or condition of one material may have enabled it to take up its full complement of sulphureted hydrogen, while the physical state of the other material precluded such thorough interaction. In such a case, the real capabilities of the materials would not be fairly gauged, as by slight variations in the density or degree of fineness and moistness of one of the material results of trials might be completely changed. It is therefore desirable that the intrinsic value of the active ingredient in each material, in the proportions in which it usually occurs therein, should be ascertained, in order that the merits of the materials may be compared apart from readily variable conditions. The thermic effects of the several reactions afford a reliable gauge of the vigor with which they proceed. In order to make a comparison of the vigor of the action of sulphureted hydrogen on Weldon mud and on bog oxide, we now purpose making a computation of the temperature which may supervene from the reactions which occur during the fouling and revivification of Weldon mud.

Weldon mud, as delivered to gas works, is a bulky black powder, containing about 54 per cent. of uncombined water, and about 26 per cent. of manganese dioxide. Gas managers prefer to store it until it has lost some portion of its large content of water; and we will assume that the mud, as put into the purifiers, contains only 40 per cent. of water. We shall not then err by under-estimating the possible thermic effects of the reactions. The percentage composition of the Weldon mud will then be about as follows: Manganese dioxide, 34; water, 40; manganese monoxide, calcium chloride, lime and other unessential ingredients (which may for the sake of brevity be termed impurities), 26. We will take it that the manganese dioxide is the only active ingredient, since it is on the basis of its content of this substance that Weldon mud is bought and sold for gas purification; and after the first fouling the other ingredients are inactive. We will also assume, as in the case of bog oxide, that the percentage of moisture in the material is not increased or decreased by the simple passage of gas through it. Sawdust and wood chips are not added to Weldon mud before it is put in the purifiers. The course of the reaction between Weldon mud and sulphureted hydrogen does not appear to have been investigated in the same manner as that between ferric hydrate and sulphureted hydrogen was by Mr. Lewis T. Wright. The reaction, so far as the ultimate products are concerned, may probably be fairly represented by the equation $MnO_2 + 2\,H_2S = MnS + S + 2\,H_2O$.

Assuming that this reaction occurs, 100 parts of Weldon mud, as put into the purifiers, will have become, when completely fouled, about 126.6 parts of a material consisting of 40 + 14.1 = 54.1 parts of water, 34 parts of manganese sulphide, 12.5 parts of sulphur, and 26 parts of the original impurities. This change will have been effected by the agency of 26.6 parts of sulphureted hydrogen. We will assume, as in the case of bog oxide, that the gas entering the purifier contains on an average 1.2 per cent. by volume of sulphureted hydrogen, which is equivalent to 755 grains per 100 cubic feet. This volume of gas weighs about 3.7 pounds, or 25,900 grains; and therefore the weight of the gas which passes out from the purifier is about 33.5 times that of the sulphureted hydrogen retained by the Weldon mud. Consequently, for every 100 parts of Weldon mud fouled 26.6 × 33.5 = 890 parts (by weight) of gas pass over it.

We have throughout ignored water of hydration, both of the dioxide and of the sulphide, with the object of simplifying the calculations. The calorific effects given below are, however, for these bodies in their customary states of hydration, though again, for simplicity of statement, we shall speak only of the dioxide and sulphide, without specifying the degree of hydration. Then the combination of 55 parts of manganese with 32 parts of oxygen, to form 87 parts of manganese dioxide, has a calorific effect of 116,280 calories. The combination of 55 parts of manganese with 32 parts of sulphur, to form 87 parts of manganese sulphide, has a calorific effect of 46,370 calories. The combination of 2 parts of hydrogen with 32 parts of sulphur, to form 34 parts of sulphureted hydrogen, has a calorific effect of 4,740 calories. The combination of 2 parts of hydrogen with 16 parts of oxygen, to form 18 parts of water, has a calorific effect of 68,360 calories.

We can now compute the net calorific effect of the changes which occur during the fouling of 100 parts of Weldon mud. To dissolve the union of manganese and oxygen in 34 parts of manganese dioxide, and the union of hydrogen and sulphur in 26.6 parts of sulphureted hydrogen, will require the expenditure of the following number of calories:

$$\frac{34 \times 116{,}280}{87} = 45{,}443$$

$$\frac{26.6 \times 4{,}740}{34} = 3{,}647$$

Total..... 49,090 calories.

The formation of 34 parts of manganese sulphide, and 14.1 parts of water, will liberate the following number of calories:

$$\frac{34 \times 46{,}370}{87} = 18{,}122$$

$$\frac{14.1 \times 68{,}360}{18} = 53{,}435$$

Total..... 71,557 calories.

The net result, therefore, of the fouling is the liberation of 71,557 — 49,090 = 22,467 calories.

The rise of temperature may then be readily calculated, by finding the weight of water equivalent to the substances which are affected by the heat liberated, thus:

	Parts.		Specific Heat.		Equivalent in Parts of Water.
Manganese sulphide.	34.0	×	0.175	=	5.95
Sulphur.....	12.5	×	0.200	=	2.50
Water.....	54.1	×	0.000	=	54.10
Impurities.....	26.0	×	0.200	=	5.20
Coal gas.....	890.0	×	0.550	=	489.50
Equivalent in water				=	557.25

The rise in temperature of the Weldon mud will therefore not exceed 22,467 ÷ 557.25 = 40.3° C. Assuming that the initial temperature in the system was 15.5° C. (60° F.), the temperature attained by the mud during fouling will be 55.8° C., or about 132° F.

We will next compute the temperature which may arise during the revivification of the completely fouled Weldon mud. The oxygen necessary for the conversion of 34 parts of manganese sulphide to 34 parts of manganese dioxide would be 12.5 parts; and this would be associated in the atmosphere with 41.5 parts of nitrogen. By the process of revivification, 12.5 parts of sulphur would be liberated from 34 parts of manganese sulphide. The revivified material derived from 100 parts of Weldon mud by complete fouling and complete revivification would therefore consist of 34 parts of manganese dioxide, 25 parts of sulphur, 54.1 parts of water, and 26 parts of impurities. From 100 parts of Weldon mud, 139.1 parts of revivified material will have been derived, if it is assumed that no evaporation or condensation of water has occurred during fouling and revivification.

To dissolve the union of manganese and sulphur in 34 parts of manganese sulphide will require the expenditure of

$$\frac{34 \times 46{,}370}{87} = 18{,}122 \text{ calories.}$$

The formation of 34 parts of manganese dioxide will liberate

$$\frac{34 \times 116{,}280}{87} = 45{,}443 \text{ calories.}$$

The net result, therefore, of the revivification will be the liberation of 45,443 — 18,122 = 27,321 calories.

The equivalent in parts of water of the substances on which this heat can take effect, may then be found thus:

	Parts.		Specific Heat.		Equivalent in Parts of Water.
Manganese dioxide.	34.0	×	0.175	=	5.95
Water.....	54.1	×	1.000	=	54.10
Sulphur.....	25.0	×	0.200	=	5.00
Impurities	26.0	×	0.200	=	5.20
Nitrogen.....	41.5	×	0.244	=	10.13
Equivalent in water.....				=	80.38

Therefore the equivalent of 80.38 parts of water will be affected by 27,321 calories; and the rise in temperature of the mass will be 27,321 ÷ 80.38 = 340° C. nearly. Assuming that the mass originally stood at 15.5° C. (60° F.), the temperature attained would be 355.5° C., or 640° F. But before so high a temperature was reached, water would be evaporated from the mass, and heat would thereby be abstracted from it. More heat than the 27,321 calories available would be needed to evaporate the whole of the 54.1 parts of water present. But by the method of calculation adopted in the investigation of the heat of revivification of bog oxide, which is sufficiently exact for the present purpose, we shall see that about 39.75 parts of water may be evaporated, and the temperature of the material remain as high as 100° C. Thus the heat required to evaporate 39.75 parts of water at 100° is 39.75 × 537 =

21,346 calories. There will therefore be available for raising the temperature of the system 27,321 — 21,346 = 5,975 calories. In place of 54.1 parts of water, we have—

	Parts.		Specific Heat.		Equivalent in Parts of Water.
Aqueous vapor.....	39.75	×	0.480	=	19.08
Water.....	14.35	×	1.000	=	14.35
Total.....				=	33.43

Substituting this figure for 54.1, we find the equivalent of the material, and nitrogen and aqueous vapor, to be 59.71 in place of 80.38. Then the temperature attained will be 5,975 ÷ 59.71 = 100° C. nearly, or 212° F.

Hence it appears that the fouled Weldon mud contained sufficient water to prevent the temperature of the mass rising above 212° F., and that, supposing evaporation did not take place below this temperature, a surplus of 14.35 parts of water would remain in the material. Under these conditions, the mass could not possibly take fire through the heat evolved during revivification. After the material had fallen to the ordinary temperature of 60° F., through the further evaporation of water, it would have the further approximate composition : Manganese dioxide, 34 parts ; sulphur, 25 ; water, 5, and impurities, 26. Thus the original 100 parts of Weldon mud will have been reduced by loss of water to about 90 parts of revivified material. The revivified material will contain about 28 per cent. of sulphur and 38 per cent. of manganese dioxide.

Practical trials of Weldon mud bear out these figures, and show that the reactions virtually extend to every particle of the manganese dioxide in it. Indeed, to obtain as low a proportion of sulphur as the above on the once fouling and revivifying of Weldon mud of the composition we are dealing with, needs special precautions against revivification *in situ* through traces of oxygen in the gas, and against reactions occurring between the sulphureted hydrogen and the materials we have classed together as impurities of the Weldon mud. Without such special precautions, or with drier Weldon mud, it is quite easy to obtain once fouled and revivified material which, after drying, contains over 40 per cent. of sulphur. We wish here to judge the Weldon mud solely on the activity of the manganese dioxide—which, as already remarked, is the constituent on which its commercial value is assessed—and the phenomena of continuous revivification must also be excluded from the calculations. Under such circumstances, it appears that Weldon mud containing, in the first instance, 40 per cent. of water will, in virtue of the activity of its manganese dioxide, yield on its first fouling, revivification, and drying a material containing about 29.4 per cent. of sulphur. If this revivified material be brought, by the addition of water, to its original degree of moistness before being put into the purifier a second time, it will contain about 17.6 per cent. of sulphur and about 25.2 per cent. of manganese dioxide.

In a subsequent article, we purpose using the figures obtained above, and in the articles on oxide already referred to, for the purpose of instituting a comparison of the intrinsic merits of Weldon mud and bog oxide for the removal of sulphureted hydrogen from coal gas. The extent to which each of these substances owes its practical success to its physical state rather than to its chemical composition, will then be briefly considered.

Two Hundred Volt Lamps.

The following excellent editorial article is from *Engineering* (London), for March 25th last :

There is the prospect that eventually all users of the electric light, supplied from direct current stations, will have to use 200-volt lamps, in place of the 100-volt lamps which, till recently, were almost universal. Many such stations have already reached the extreme limit of distance to which their mains can be extended without a ruinous outlay in copper, and have even gone beyond the radius at which they can guarantee fairly uniform pressure at all times under existing circumstances. It has, therefore, become imperative with them to raise the electromotive force, so as to reduce the amount of current to be sent through the mains, and this, of course, means new lamps. Some have gone to 200 volts at the consumer's terminals, some to 220, and a few to 230 volts. This latter makes a difference of potential of 460 volts across the 3-wire system, or almost the 500 volts allowed by the Board of Trade.

The change has worked most admirably for the owners of continuous current supply stations, lifting a whole load of trouble off their heads. They can now extend their mains far into the suburbs, gathering in new customers, without adding to their fixed expenses at the station, and can, therefore, reduce the cost of current per Board of Trade unit. If they had been confined to the old pressure they must have either used distant battery stations, or motor generators, or else have built new supply stations, which for some time would have shown a loss in place of a profit. The only person to be inconvenienced is the consumer who has fitted his house for 100-volt pressure. His fuses have to be altered, while prudence would counsel the use of new switches, wall plugs and ceiling roses, with better insulation and an increased break. But it is in his lamps that he feels the change most severely, for he is put to continually increased expense. The 200-volt lamps have a lower efficiency than the old ones, and consumers sometimes grumble that they give less light. This fact came out in the recent discussion before the Institution of Electrical Engineers, on Mr. Bingswanger Byng's paper, "On the Manufacture of Lamps and other Apparatus for 200-Volt Circuits." Mr. H. W. Miller said that in Kensington they had had many complaints of the new lamps giving less light than the old ones, but he believed that they were of an inferior make. Mr. W. R. Rawlings, who spoke as a wiring contractor, stated that his customers who had gone over from 100 volts to 200 volts were most dissatisfied, while those who had been fitted with 200-volt lamps in the first instance made no complaint. Mr. J. S. Raworth explained that he had received large numbers of sample lamps, and that out of one dozen 25 per cent. broke immediately they were lighted, while the mortality was great in all his lamps.

The author of the paper, who is a lamp maker, did not give a very flattering picture of high voltage lamps, at least when in bulbs of the old size. In order to give the filament the necessary resistance it has to be thinner than formerly, for there is not space in the bulb to accomodate a filament of double length. It is, therefore, customary to use "unflashed" filaments—that is, those which have not been built up by the direct deposition of carbon from a hydrocarbon gas. Such filaments are darker and rougher on their surface than flashed filaments ; their candle power falls off more rapidly, and their efficiency decreases at a quicker rate. These are very serious charges, and, coming from the lips of a manufacturer of lamps, they cannot be disregarded. It is to be noted, however, that they only refer to lamps with nominal sized bulbs. By a small increase in size it is possible to make 200-volt lamps with flashed filaments. No speakers in the discussion denied Mr. Byng's main proposition, although some suggested modification. Mr. C. H. Stearn, whose reputation as a lamp maker stands very high, said that in lamps of 200 volts there were two alternatives : to use carbon with high specific resistance with the drawback that there would be a more rapid change in candle power ; or with a low specific resistance (flashed) with such an alteration of the mechanical construction as would give greater rigidity. The first alternative was the best for the transitional period. Flashed carbons must be thick, and for a 16-candle power 230-volt lamp the length of filament must be 14 inches or 15 inches. A carbon of this length cannot be safely used, either singly or double, without some special method of disposing of it.

Broadly, the result of the discussion was to show that the 200-volt lamp is neither so efficient nor so durable as the 100 volt lamp; in other words, the consumer must spend more money in renewals if he is to keep down his bill for current. On the other hand, high voltage reduces the expenses at the central station, and eventually the charge per Board of Trade unit. It also enables people to have electric light who otherwise would not have it for some years to come, as it enables scattered districts to be served at a reasonable outlay. In electric lighting every economy is to the advantage of the consumer, for under the system of account keeping insisted on by the Government every detail of working is revealed, and it is not possible for officials to have the pleasant times which often prevail in gas works. There is a keen competition between central station engineers to keep down each individual source of cost, and they are quite alive to the fact that the greatest economy is found in an increased demand. Hence the user of 200 volt lamps has the satisfaction of knowing that while his lamp bill is large, he is on the way to see a reduction in the cost of current.

This consideration applies to continuous current supply far more than to alternate current. Several high-tension supply stations have already adopted the 200-volt system with very much less justification than the low tension systems can show. They cannot plead that they are hampered in making extensions, for they have often voluntarily adopted remote sites for their works. The West End of London is supplied, in part, from Deptford ; Clerkenwell is lighted by current generated on the Wandle ; the Metropolitan Company contemplate building a large station near Willesden ; at Bournemouth the machinery is nearly 2 miles from the center of the town; and so on. In any case the size and cost of the mains is not affected by the pressure at the consumer's terminals. The secondary network certainly is ; the higher the pressure, the smaller the number of transformer sub-stations required. But as

these chambers are usually built in the public roads, and need very little attendance, their cost is not great. Of course, there is some saving to alternate current supply companies by high voltage, but it is not large enough to justify them in imposing it on consumers in the present state of the lamp industry. The discussion we have referred to showed clearly enough that the 200-volt lamp has not yet assumed its final form, and that an experiment of great magnitude is being made at the cost of users. We know that lawyers "never argue at their own expense," and engineers follow their methods very closely; but there are limits beyond which it is not well to push even such a good principle as *experimentum fiat in corpore vili*. When the possible gain to the experimenter is small compared with the inconvenience to the "vile body," good commercial principles forbid the research to be made, more especially when exactly the same information can be gained by others under conditions which are distinctly justifiable. There are enough continuous current stations supplying at from 200 to 250 volts now to keep lamp makers engaged, and to furnish them with ample opportunities of putting their theories to test on a full commercial scale. Less than this would not secure the necessary competition to insure progress; more than this is not wanted.

When the consumer pays an enhanced price for 200-volt lamps, which have a low efficiency, and which fall off rapidly in candle power, he has the consolation of knowing, if he be on continuous current circuit, that he is aiding very materially in the extension of electric lighting, and in effecting a reduction in its cost. But if he be on an alternating circuit he can lay very little comfort of this kind to his soul, and he has a real grievance that such a sacrifice should be forced upon him in the present state of affairs. Three or four years hence the conditions will, in all probability, be entirely changed, and satisfactory lamps, even of small candle power, will be at our command. Then the change can be made without entailing any great expense to householders, and be reasonably enforced. In the meantime engineers will be well advised to hasten slowly in the matter of increased pressure on alternating circuits, and to let the large experiment, already well in progress, be worked out more completely than it is at present. No doubt it looks very smart to be among the first to adopt advanced methods, expecially at others expense; but from a commercial point of view it is far better to come in when the experimental stage is completed, and the result of other people's researches can be appropriated for the benefit of one's customers. After all, the consumer is entitled to some consideration, even when he has wired his house, and consequently has no choice but accept what is given to him.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE Brooklyn (N. Y.) *Daily Eagle*, dated Sunday, April 3, had this to say: "The Brooklyn Borough Gas and Fuel Company's shareholders met last week and organized. The officers are: President, Burdett Loomis, Hartford, Conn.; Vice President, Frederici Munch, Philadelphia; Secretary and Treasurer, Robert Forerderer, Philadelphia. The capital stock is $500,000. The capital of the Coney Island Gas Company, which this new Company absorbed, was $160,000, with outstanding debts of as much more. Mr. Loomis, who is the inventor of the Loomis system of making gas, says that the Company has no intention of competing in any way with the Brooklyn Union Gas Company, and that its charter only grants it rights in the 31st Ward. It is its plan to extend and improve the system and give good service to the people of the Ward. The Company will charge $1.25 per 1,000 for its product and will supply illuminating gas only."

A FEATURE of the March meeting of the Engineers' Club of Columbus, Ohio, was a paper, by Mr. J. A. Mayers, Superintendent of Construction of the Columbus Gas Company, descriptive of the Columbus Company's new holder. The author held the close attention of his hearers, and his presentation was much amplified and emphasized by an excellent series of stereopticon views. The proceedings were held in the handsome chapel of the Ohio State University.

AT a recent meeting of the Bristol County (R. I.) Gas and Electric Lighting Company a dividend of $1 per share was declared.

MR. BANKSON TAYLOR, of St. Paul, Minn., has begun an action in the District Court to compel Mr. John B. Meagher to assign to him 500 shares of stock in the Mankato (Minn.) Gas and Electric Light Company, of the par value of $50,000. It is alleged that when the Company was organized, Mr. Rensselaer D. Hubbard was the owner of 1,000 shares of the stock of the par value of $100,000. Mr. Hubbard afterwards assigned, and at the time of the assignment owed the First National Bank of St. Paul $45,000, protected by $60,000 of the Mankato bonds. It is alleged that in December, 1897, the plaintiff and the defendant in this action made an agreement whereby the defendant was to secure Mr. Hubbard's stock and bonds for Mr. Meagher, and for commission was to receive one-half of the stock. He claims to have made an agreement with the bank whereby it was to obtain from Mr. Hubbard's assignee the 1,000 shares of stock and the bonds, on condition of releasing the claim against the estate under the $45,000 note. This compromise was allowed by the Court, and the stock and bonds were transferred to Mr. Meagher. Mr. Taylor claims that half of the stock should belong to him, and he asks the Court to compel Mr. Meagher to transfer it to him.

AT the annual meeting of the Red Bluff (Cal.) Electric Light and Gas Company the following officers were chosen: Directors, E. W. Runyon, D. S. Cone, W. B. Cahoone and John Clements, of Red Bluff; and John D. Sherwood, of Spokane, Wash.; President, E. W. Runyon; Vice-President, D. S. Cone; Treasurer, Bank of Temaha County; Secretary and Manager, John S. Clements.

ADDITIONAL evidence that the proprietors of the Meriden (Conn.) Gas Light Company acted wisely and well when they selected Mr. Chas. A. Learned to fill the Superintendency made vacant by the death of Mr. J. A. Hadley, is shown in the announcement that, since the 1st inst., the net rate for gas rules at $1.50 per 1,000 cubic feet. The gross price is $1.65, with a discount of 15 cents for prompt payment—within 16 days. A further concession, to those who use 100,000 cubic feet and over per quarter, puts the net price to them at $1.35 per 1,000. The demonstration lectures on cooking by gas, so well carried out by Mr. Learned last year, must have borne great results, for this year he agrees to place a standard make of gas range, connected up and ready for use in the kitchen, at the surprisingly low figure of $12.

MR. J. W. R. CLINE, Manager of the Springfield (O.) Gas Company has been appointed to the Board of Trustees of the Ohio Soldiers' Home, Vice, Mr. R. B. Brown, resigned. Mr. Cline is prominent in G. A. R. circles.

A CORRESPONDENT, writing under date of March 29th, says: "The properties of the Port Huron Gas Light Company and the Port Huron Fuel, Gas and Light Company, of Port Huron, Mich., have been consolidated, and the reorganized corporation will be known as the Port Huron Gas Company. The officers of the new Company are: President, James T. Lynn; Vice-President, A. D. Bennett; Secretary and Treasurer, Isaac C. Baxter; Superintendent, Joseph Walker. In addition to the gentlemen above named, Jerome Croul, Eugene T. Lynch and J. Goulden constitute the Board of Directors. Messrs. Bennett, Goulden and Walker are the only members who were previously connected with the old Companies. From the above it may be noted that a strong Detroit combination figures in the transfer of the named properties. Col. Jerome Croul was for many years Vice-President of the Detroit Gas Light Company, and is now President of the Windsor (Ont.) Gas Company, of which corporation Isaac C. Baxter is President, and Mr. Jas. T. Lynn is its managing Director. Mr. Eugene T. Lynch has been President of the Detroit Gas Light Company since 1894. It is stated that Mr. Lynn will make his home in Port Huron, for a time at least, and that the parties interested are figuring upon further investments by which several other gas properties may pass into their control. There is no need to add that whatever these gentlemen do will be done well, and the citizens of Port Huron will find their interests, as patrons of the Company, carefully guarded, in that the best possible service will be given them at all times. Extensive improvements are to be made on the old works, and the main system will be added to, with the probability that gas service will be made in the outlying district of Fort Gratiot before the end of the year. The fuel gas plant of the absorbed opposition concern will most likely be abandoned. The many friends of Messrs. Baxter and Lynn will be more than pleased over the assurance that they are to remain aggressive factors in the gas industry, upon which they have greater prospects of wielding an influence than ever before. A new card is out in Detroit, which reads about as follows: 'Baxter & Lynn, Consulting and Contracting Gas Engineers. Office: Wayne County Savings Bank Building, Detroit, Mich.' There should be boundless success in this combination, for its members possess that capability and knowledge necessary to gaining for them

work and fortune in gas plant planning and construction. They have already secured a contract for the remodeling of the Benton Harbor-St. Joseph (Mich.) Gas Company's works and the extension of its mains into and through the streets of St. Joseph, Mich. Another contract in hand is for the improvements to be made this season on the plant at Sarnia, Ont. This mention would seem to be incomplete without the recounting of some of the things done by Messrs. Baxter and Lynn in their connection with the gas industry. Mr. Baxter has for many years been actively prominent in his chosen profession. In the '70's several gas plants were constructed by him in Indiana, prior to which time he had thoroughly mastered the details of the business, by practical work in Allegheny and Pittsburgh, Pa., and in Washington, D. C. He assumed the duties of Engineer and Superintendent to the Evansville (Ind.) Gas Light Company, retiring from there, January, 1889, to assume a similar position with the Detroit Gas Light Company. The condition of gas affairs in Detroit at that time was little short of chaotic, and the plants of the hitherto competing Companies were in wretched physical condition. His ability and untiring energy, however, in due time evolved order out of disorder and secured profit instead of loss. To-day the gas works of Detroit are modern and complete, and stand as evidence of his well directed methods. Out of the chaos of 1889 has been evolved a plant equipped with improved benches and a satisfactory water gas apparatus, with the accessories of ammonia and tar works and a Pintsch oil gas plant. On the consolidation of the opposition interests in Detroit, and when the Company's finances were insufficient to permit of extensions to the producing plant, Mr. Baxter cleverly introduced a system of his own for carbureting natural gas and easily met every requirement occasioned by a rapidly increasing output. Mr. Baxter is a man of sound judgment, amply fortified with excellent mechanical training and energetic business methods. Mr. James T. Lynn has, since 1893, been Superintendent of Distribution at Detroit, previous to which time he managed gas plants at Chattanooga and Memphis, Tenn.; and Evansville, Ind. That which was said of Mr. Baxter's connection with the Detroit works is equally true respecting Mr. Lynn's experience at Chattanooga and Memphis. He has been actively engaged in numerous natural gas undertakings, and is considered one of the best authorities in the country along that line of business. He has done much construction work in the Ohio and Ontario fields, and has always proved his ability to perform any duty in a creditable and satisfactory manner. The greater part of the present artificial and natural gas main systems of Detroit was completed under his supervision. During these busy years he has always enjoyed the confidence of his superior officers and the respect of his workmen. I am sure the JOURNAL and its readers will heartily join me in wishing unbounded success to the new engineering firm of Baxter and Lynn."

UNDER the reorganization at Port Huron, Mich., the net rates for gas have been adjusted on the following basis: For an illuminating supply, $1.25 per 1,000; for a supply on fuel account, 80 cents per 1,000.

ON the 2d inst. the West Manayunk Gas Company was absorbed by the United Gas Improvement Company, through means of a lease covering a period of 999 years. The lease is based on an annual rental payment. The West Manayunk Company's storage plant is located between the Schuylkill canal and Nixon street, below Fountain street, Philadelphia, and its franchise covers the territory between the Schuylkill canal, the Schuylkill river and Lower Merion township, Montgomery county, Pa.

MR. DUNCAN JONES, Secretary of the New Orleans (La.) Gas Light Company, has issued notice to holders of the Company's third series bonds, that those numbered from 301 to 450, inclusive, have been called in, according to the terms of the loan. Payment will be made for same at the office of the Company, on and after Monday next.

THE Fire Committee of the San Francisco Board of Supervisors proposes to enact the following amendment to section 107 of the local fire ordinances: "No person or persons, firm or corporation shall erect any works, apparatus, gas machine or machinery of any kind for the manufacture of illuminating gas within the city and county of San Francisco, without permission of the Board of Supervisors." Mr. Britt, who prepared the amendment, said it was introduced at the instance of the Fire Department, so that a perfect record of all the gas and gasoline plants could be kept. The record was desired for the protection of property owners, gasoline plants being deemed a menace at all times, and acetylene gas, the product of carbide of calcium, was considered combustible and explosive to a dangerous degree.

PETER L. YOE, many years ago prominent in the management of the old Chicago Gas Light and Coke Company, died at his home in Chicago on the night of the 3d inst. Deceased, who was born in Sing Sing, N.Y., June 20, 1815, settled in Chicago in 1843, and amassed a fortune in the saddling and harness trade. His widow, a son and a daughter, survive him.

THE Springfield (Ohio) Gas Company is to have handsome offices in the building located at the junction of Main and Center streets.

THE reduction ordered by the proprietors of the Jamaica Plain (Mass.) Gas Light Company, in the gas rate for Jamaica Plain, took effect the 1st inst. The reduction amounted to 15 cents per 1,000; from $1.40 to $1.25.

MR. J. A. JONES, of Los Angeles, Cal., proposes to establish a gas plant in Santa Monica, Cal.

A CORRESPONDENT forwards the following summary of the annual report of Mr. J. W. Patterson, Inspector of illuminating gas and gas meters for Allegheny county, Pa.:

Allegheny county's populace consumed 840,277,370 cubic feet of illuminating gas in the past year. It has been measured by over 23,000 meters. In spite of the ubiquitous complaint of the gas consuming public about the meter, fault could be found with only 14 of these. The slot machine meter is the thing for the future, however. All this is set forth in the report of J. W. Patterson, Inspector of illuminating gas and gas meters in Allegheny county. He has just finished the report for Governor Hastings.

Concerning the recent gas consolidation the Inspector says: "The capital invested remained unchanged during the past year, and shows $3,521,700 invested in the illuminating gas business in the county. I may say that it is current rumor that some of these companies have or are about to consolidate, but of this I have no official knowledge. If I except McKeesport all the companies in operation seem to be in a prosperous condition, approximating the business of last year. The McKeesport Company charges its falling off to the fact that natural gas companies are selling gas in its territory for illuminating as well as fuel purposes, and at such a rate that it cannot compete with them."

Inspector Patterson says that 23,067 customers consumed the gas. This is the clientele of all the companies, and is a decrease of 262 from last year, but an increase in seven years of 5,443. Electric lighting, he says, has not reached the point of perfection and low price that will enable it to seriously affect gas. Though the illuminating value prescribed by law is 15-candle power, the minimum in this county is 17 51-100, and the average over 20.

Continuing, the report says, concerning meters: "It will be seen that 1,390 meters were inspected. Of these 693 were new, 659 repaired and 38 contested. Of the contested meters you will notice that only 14 were in excess of the percentage of error allowed, and were rejected, so that when it is considered that out of the service of 23,069 only 38 were questioned, and out of this number but 14 were rejected, we may conclude that gas is probably measured and sold with a greater degree of accuracy than any other commodity purchased by the public, and in this connection I may say that the gas meter is often charged with the sin of the gas burner, for nothing is more important in the economical consumption of gas than a good burner properly cared for, and nothing receives so little attention."

Here attention is called to the slot meter. During the year 270 of this sort were inspected. By this device gas is paid for before consumption, and in such small amounts that it is scarcely felt by the consumer, and those who use them are not confronted with a quarterly bugaboo of a big gas bill.

In the use of a gas meter 3 per cent. of error is allowed by law. Of the 38 contested meters the Inspector found 12 that were less than 3 per cent. fast and 7 slow by less than 3 per cent. The other 14 were rejected. There are 10 companies in the county—the Pittsburgh, the East End, the Allegheny, the Southside, the Consolidated, the McKeesport, the Sewickley, the Sharpsburg and Etna, the Braddock Gas Light Company and the Welsbach. The last named Company makes no gas itself, and has but four meters in use. The average price per 1,000 feet during the year was $1.04. The number of miles of pipe is 373.12.

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MONDAY, APRIL 11, 1898.

The Market for Gas Securities.

The international situation and its possibilities dominate the market completely, as they rightly should; for people supposedly standing on the brink of warfare are not given to extending their holdings, along lines of either speculation or investment. Perhaps, though, the uncertainty has as much to do with the lowering of values as the actual breaking out of hostilities would exert. That is to say, that open warfare could hardly be counted on to depress values more than they are now depressed; and particularly does this apply to gas share values. The feature of the week in local gas securities was the break in Mutual, which is bid 290, offered at 300. From our point of view, Mutual should have scored an advance rather than a decline, provided our knowledge regarding its attitude toward consolidation is well based. Consolidated remained steady, at the decline of a week ago, the opening to-day (Friday) having been made at 178 to 179. Standards, common and preferred, also sold off sharply.

Brooklyn Union is measurably stronger than it was last Friday, but is still ridiculously low. Detroit gas is quoted at 62 to 62½. Baltimore Consolidated advanced to 59½ on the failure to put through the Legislature the proposed opposition gas charter for Baltimore. This time Baltimore Consolidated should cross 70. Peoples, of Chicago, looks tempting, at 91½ to 92. United Gas Improvement Company is 212 bid, and Welsbach Light Company, reflecting Judge Townsend's recent decision, is strongly held at 43½ to 44—that quotation, of course, being based on the par of $5 per share. Lacledes are in better demand, at increasing figures.

Gas Stocks.

Quotations by Cochran & Close, Brokers and Dealers in Gas Stocks.

35 WALL ST., NEW YORK CITY.

APRIL 11.

☞ All communications will receive particular attention

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$36,220,000	100	177¼	178¼
Central	500,000	50		..
" Scrip	220,000	..	100	.
Cental Union, Bonds, 5's	3,000,000	1,000	99½	100
Equitable	4,000,000	100	217	225
Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	114	.
Metropolitan Bonds	658,000	..	108	112
Mutual	,500,000	100	290	300
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	.	..	
New Amsterdam Gas Co.	13,000,000	100	27½	29
Preferred	10,000,000	100	65	67
Bonds, 5's	11,000,000	1,000	97	98
Northern	150,000	50	..	
" Bonds	150,000	1,000	..	
Northern Union, Bonds, 5's	1,250,000	1,000	94½	95½
New York and East River	5,000,000	100	81	88
Preferred	2,000,000	100	112	115
Bonds 1st 5's	3,500,000	1,000	109	111
" 1st Con. 5's	1,500,000	..	102	105
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	127	135
Preferred	5,000,000	100	145	155
Bonds, 1st Mortgage, 5's	1,500,000	1,000	114	115
Yonkers	299,650	50	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	110¼	111
" " Bonds (5's)	15 000,000	1,000	111	112½
Bay State	50,000,000	50	3	3½
" Income Bonds	2,000,000	1,000	..	75
Boston United Gas Co.—				
1s Series S. F. Trust	7,000,000	1,000	89	90
2d " " "	3,000,000	1,000	..	70
Buffalo City Gas Co.	7,000,000	100	27	27
" " Bonds, 5's	7,000,000	1,000	89	91
Central, San Francisco	2,000,000	..	95	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Columbus	1,069,000	.	89	91
1st Mortgage	1,085,000	..	101	103½
Consumers. Jersey City	2,000,000	100	75	80
" Bonds	600,000	1,000	103¼	105
Cincinnati G. & C. Co.	8,500,000	100	..	201¼
Consumers, Toronto	1,600,000	50	184½	187
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Consolidated, Baltimore	11,000,000	100	59¼	59½
Mortgage, 6's	3,600,000	..	107	107½
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490,000	..	..	..
Consolidated G. & E. Co.'s, Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit	4,000,000		62	62½
" Con. Bonds	4,312,000	..	..	95
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	78	81
" Bonds	2,000,000	..	89	91
Hartford	750,000	25		145
Indianapolis	2,000,000	..	115	125
" Bonds, 6's	2 650,000	..	106	107
Jersey City	750,000	20	180	..
Lafayette Gas Co., Ind.	1,000,000	100	78	83
Bonds	1,000,000	1,000	90	91
Louisville	2,570,000	50		..
Laclede, St. Louis	7,500,000	100	42¼	43
Preferred	2,500,000	100	84	90
Bonds	9,084,400	1,000	101	102
Montreal, Canada	2,000,000	100	200	..
Newark, N. J., Gas Co.	1,000,000	..	200	220
Bonds, 6's	4,000,000	..	128	130x
New Haven	1,000,000	25	252	..
Oakland, Cal.	2,000,000	..	53¼	54
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	91⅝	91¾
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,00	1,000	..	108
2d "	2,500,000	1,000	104	105
Peoples, Jersey City	500,000	50	..	175
Rochester Gas & Elec. Co.	2,150,000	50	..	..
Preferred	2,150,000	50	83	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	94	94½
St. Paul Gas Light Co.	1,500,000	100	49	51
1st Mortgage 6's	650,000	..	84	87
Extension, 6's	600,000	..	..	..
General Mortgage, 5's	2,400,000	..	88	90
Syracuse, N. Y.	2,500,000	25	17	19
Bonds	1,000 000		94	97
Washington, D. C	2,000,000	20	250	
Western, Milwaukee	4,000,000	100	78	80
Bonds, 5's	3,556,000	.	102¾	103¼
Wilmington, Del.	530,000	50	200	

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DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO., 813 DREXEL BUILDING, PHILA., March 25, 1898.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable on April 15, 1898, to stockholders of record at the close of business March 31, 1898. Checks will be mailed.

1191-2 EDWARD C. LEE, Treasurer.

"King's Treatise."

Wanted, a second-hand set of "King's Treatise," in good condition. State price. Address

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SALE OF GAS and ELECTRIC LIGHT PLANT.

The undersigned, as Receiver, will, on Tuesday, the 31st day of May, A.D. 1898, at the north door of the Court House, in Girard, Crawford County, Kansas, offer for sale to the highest bidder for cash at time of sale, the gas and electric light plants of the Pittsburg Gas Light and Coke Company, of Pittsburg, Kansas, which comprises one-half block in the center of the city, with the improvements and machinery thereon, and the gas and electric light systems of the city of Pittsburg. The Pittsburg Gas Light and Coke Company is a Kansas corporation with a capital stock of $100,000. The property will be sold subject to outstanding bonds in the sum of $52,500, and for not less than sufficient to pay outstanding Receiver's certificates and expenses, and costs, which at the time of sale will approximate $12,000. The gross yearly income from the plants averaged $19,000 for the past two years, and improvements to the amount of $10,000 have been added to the property during that time. The Gas Company has a lighting contract with the city that has yet 10 years to run, that pays about $5,000 per year. Pittsburg, Kansas, in March, 1897, had a population of over 12,000. It has since increased. It is in the center of the coal and zinc region of Southeastern Kansas, and is the most progressive and thrifty city in the State. During the year ending March, 1897, the population increased upward of 2,000. The property is desirable for any one seeking that kind of investment. For further particulars address the undersigned,

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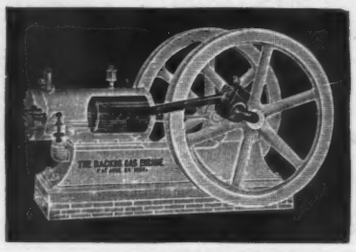

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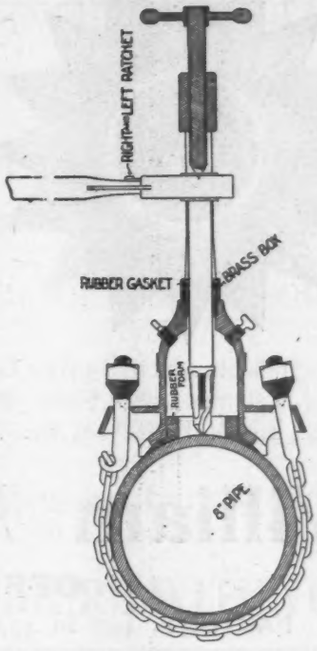

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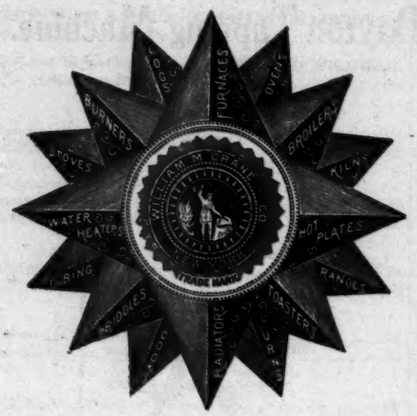

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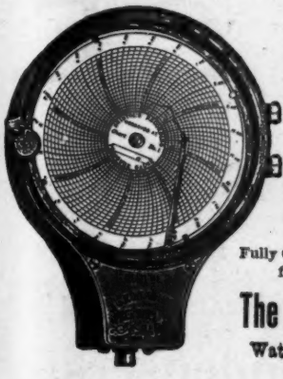

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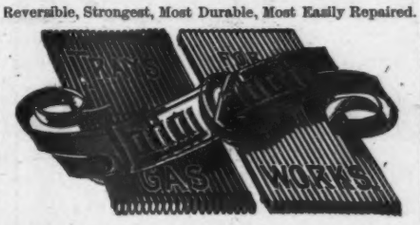

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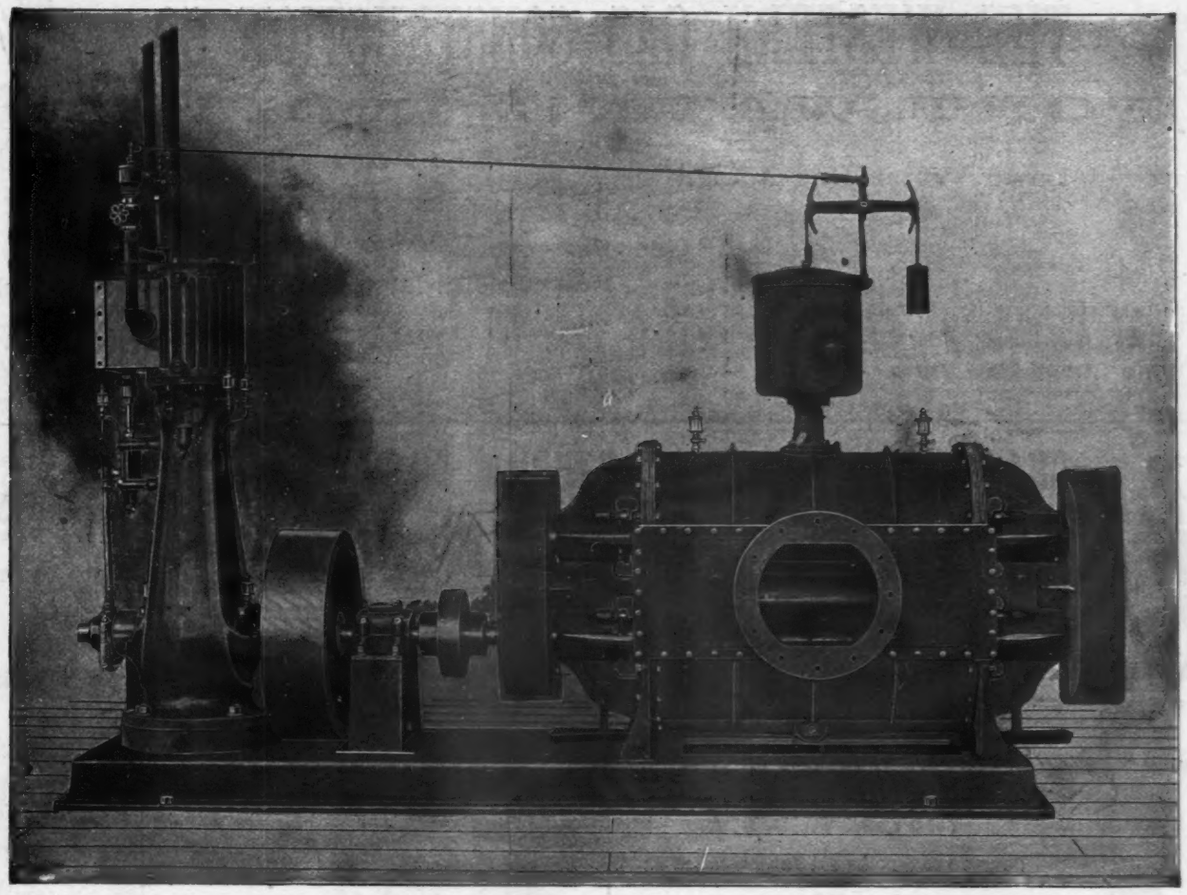

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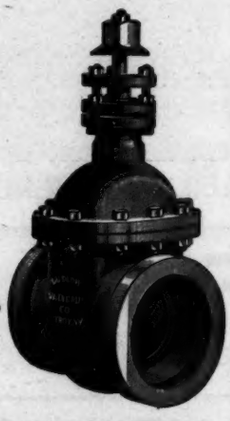

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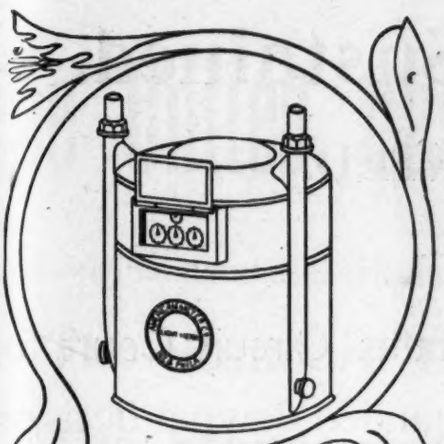

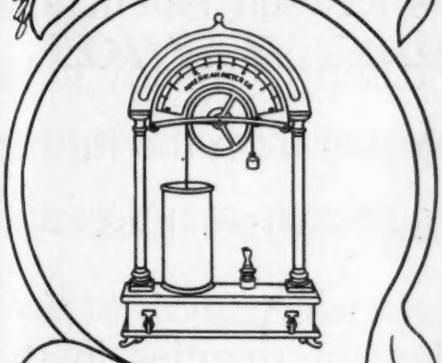

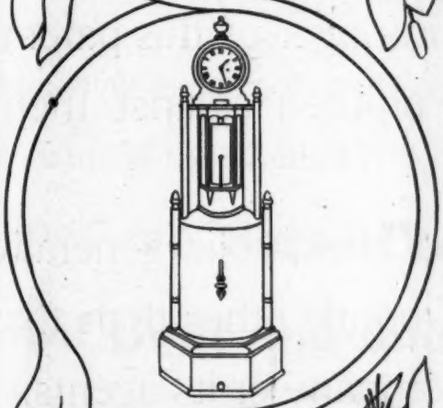

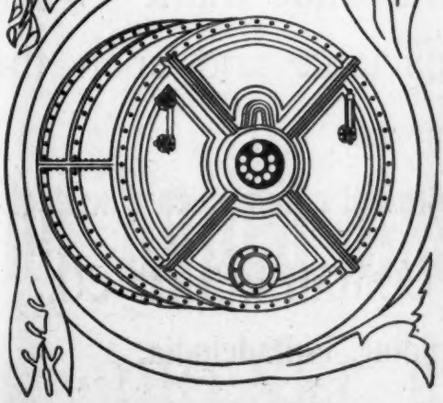

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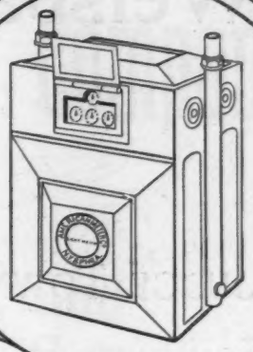

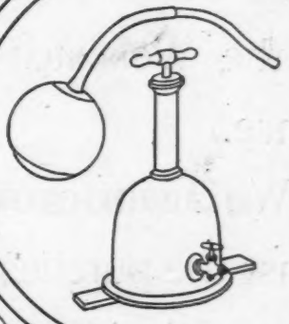

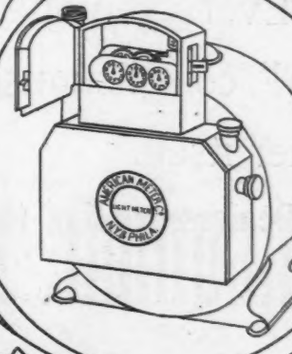

PUBLIC LIGHTING TABLE.

APRIL, 1898.

Day of Week.	Date.	Table No. 1. FOLLOWING THE MOON. Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Fri.	1	2.20 AM	4.50 AM	6.10	4.55
Sat.	2	2.40	4.50	6.15	4.40
Sun.	3	3.10	4.40	6.15	4.40
Mon.	4	3.30	4.40	6.15	4.40
Tue.	5	No L.	No L.	6.15	4.40
Wed.	6	No L. PM	No L.	6.15	4.40
Thu.	7	No L.	No L.	6.15	4.40
Fri.	8	7.00 PM	10.10 PM	6.15	4.40
Sat.	9	7.00	11.20	6.25	4.30
Sun.	10	7.10	12.30 AM	6.25	4.30
Mon.	11	7.10	1.30	6.25	4.30
Tue.	12	7.10	2.20	6.25	4.30
Wed.	13	7.10 LQ	3.00	6.25	4.30
Thu.	14	7.10	3.30	6.25	4.30
Fri.	15	7.10	4.00	6.25	4.30
Sat.	16	7.10	4.20	6.30	4.20
Sun.	17	7.10	4.20	6.30	4.20
Mon.	18	7.10	4.20	6.30	4.20
Tue.	19	7.10	4.20	6.30	4.20
Wed.	20	7.10 NM	4.20	6.30	4.20
Thu.	21	7.10	4.20	6.30	4.20
Fri.	22	7.10	4.20	6.30	4.20
Sat.	23	7.10	4.20	6.40	4.10
Sun.	24	7.20	4.10	6.40	4.10
Mon.	25	10.30	4.10	6.40	4.10
Tue.	26	11.10	4.10	6.40	4.10
Wed.	27	11.50	4.10	6.40	4.10
Thu.	28	12.20 AM FQ	4.10	6.40	4.10
Fri.	29	12.40	4.10	6.40	4.10
Sat.	30	1.10	4.10	6.45	4.00

TOTAL HOURS LIGHTING DURING 1898.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	210.40	January	423.20
February	186.40	February	355.25
March	181.20	March	355.35
April	166.10	April	298.50
May	156.40	May	264.50
June	144.30	June	234.25
July	147.30	July	243.45
August	157.10	August	280.25
September	169.50	September	321.15
October	186.00	October	374.30
November	204.30	November	401.40
December	218.30	December	433.45
Total, yr.	2129.30	Total, yr.	3987.45

Welsbach Patent Sustained.

INJUNCTION GRANTED.

JUDGE TOWNSEND, in the United States Circuit Court for the Southern District of New York, has handed down a decision sustaining the Welsbach Light Company's Rawson Patent, and adjudged the Sunlight Incandescent Gas Lamp Company to be an infringer. This Company has been enjoined from the further use of its method of manufacture of incandescent mantles, and ordered to render an accounting.

Every other manufacturer of incandescent mantles in the United States is, under this decision, an infringer of this patent, and the Welsbach Light Company will proceed against them at once.

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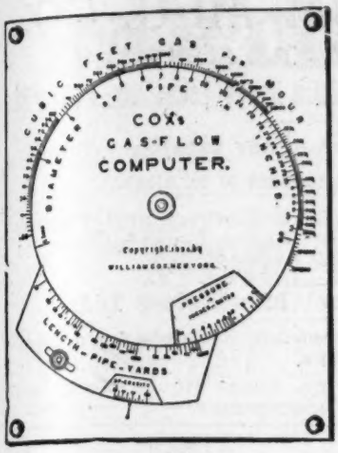

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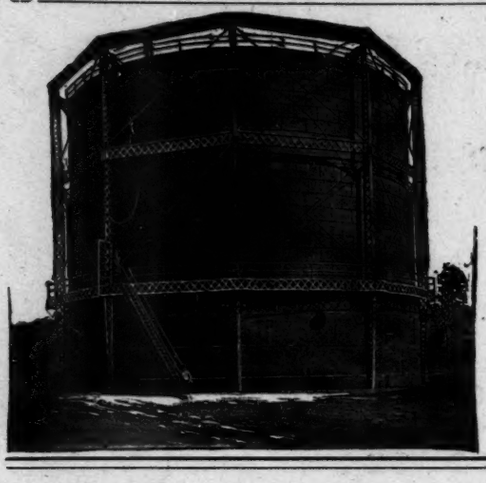

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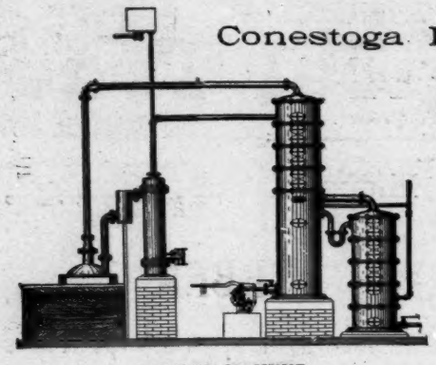

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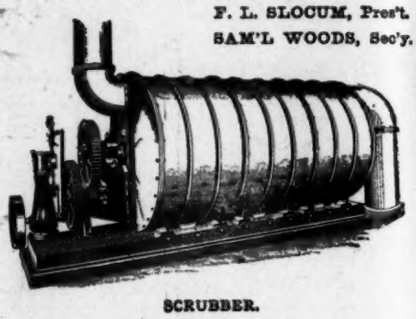

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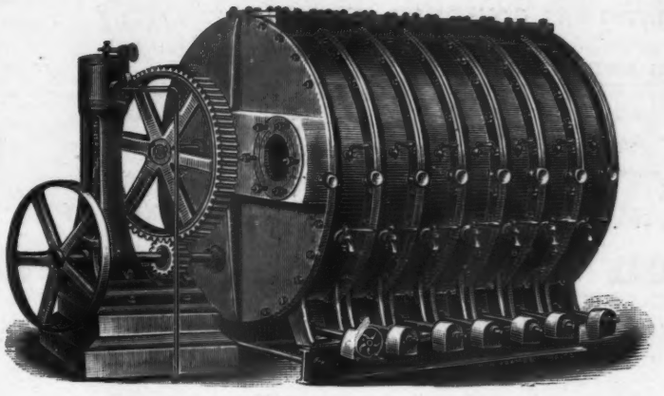

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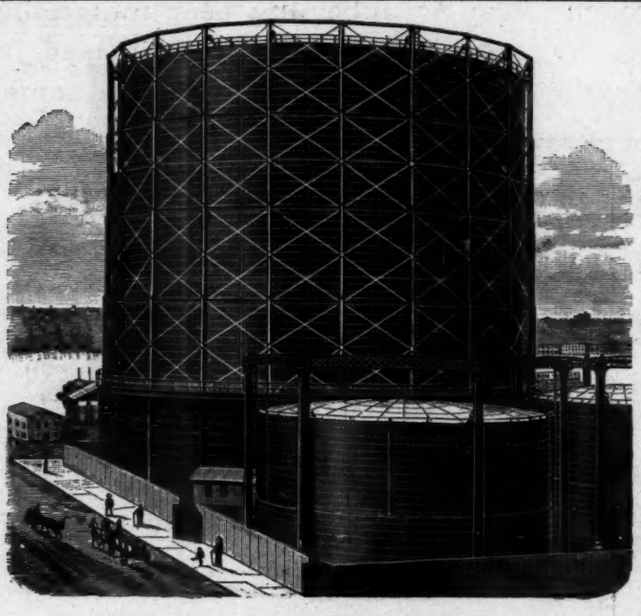

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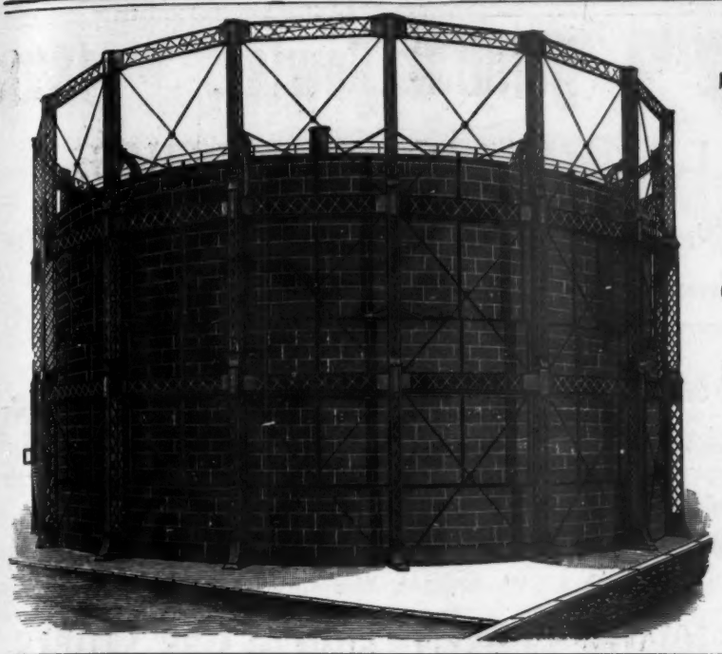

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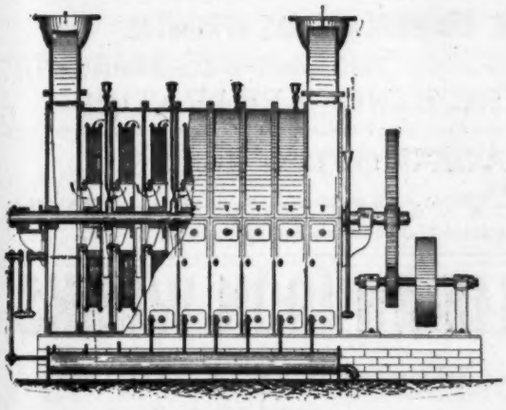

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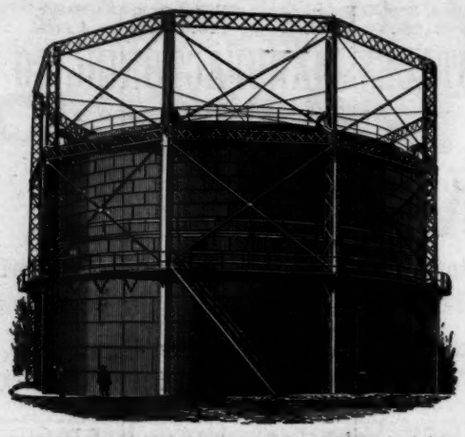

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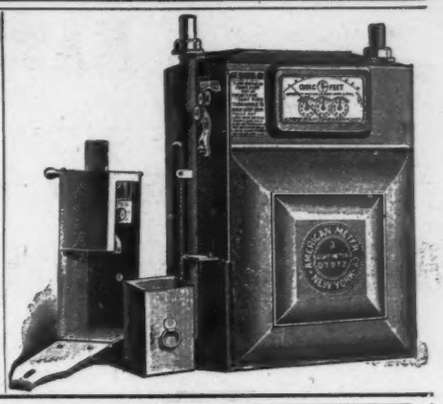

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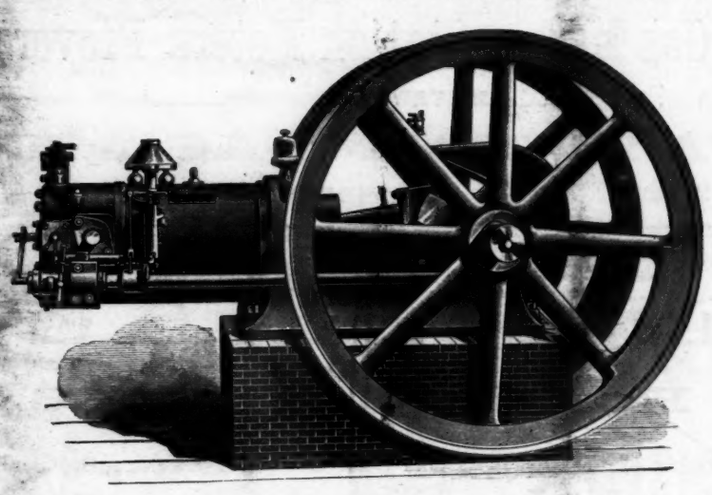

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